A REVISION AND PHYLOGENETIC ANALYSIS OF THE SPIDER SUBFAMILY PHYXELIDINAE (ARANEAE, AMAUROBIIDAE)

CHARLES E. GRISWOLD

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A REVISION AND PHYLOGENETIC ANALYSIS OF THE SPIDER SUBFAMILY PHYXELIDINAE (ARANEAE, AMAUROBIIDAE)

CHARLES E. GRISWOLD
Kalbfleisch Research Fellow, Department of Entomology, American Museum of Natural History
Postdoctoral Research Fellow, Department of Entomology, National Museum of Natural History, Smithsonian Institution

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ABSTRACT

The subfamily Phyxelidinae Lehtinen of the Amaurobiidae is diagnosed and revised, and a key to and distribution maps of the 53 valid and 1 undescribed species are provided. The subfamily comprises 12 genera placed in three newly described tribes: *Ambohima*, new genus, *Kulalania*, new genus, *Lamaika*, new genus, *Malaika* Lehtinen, *Matundua* Lehtinen, *Namaquarachne*, new genus, *Phyxelida* Simon, *Pongolania*, new genus, *Themacrys* Simon, *Vidole* Lehtinen, *Vytfutia* Deeleman-Reinhold, and *Xevioso* Lehtinen. *Vytfutia* is newly transferred to the Phyxelidinae. Members of the Phyxelidinae occur in Africa, Madagascar, the eastern Mediterranean, and southeast Asia. The Phyxelidinae is monophyletic and is defined by the following putative synapomorphies: at least some of the basal prolateral setae on the palpal femora of both sexes are enlarged, and in many species the setae are also modified into thorns; the tarsal trichobothria are lost and the metatarsal pattern is reduced to a single subapical dorsal trichobothrium; and the origin of the calamistrum is shifted to the median part of the fourth metatarsus. Previous familial placements of the spiders here placed in the Phyxelidinae are critically evaluated, and it is concluded that the Phyxelidinae are members of the Amaurobiidae. The Amaurobiidae is redefined on the basis of putative synapomorphies as spiders with a divided cribellum which have simple, sclerotized retrolateral and dorsal tibial processes on the male palp (however, the retrolateral process is lost in all Phyxelidinae except *Vytfutia*). A cladogram for the 54 species of the Phyxelidinae derived through numerical parsimony analysis using Swofford's program PAUP is presented. The following new taxa are proposed: new tribes: Vytfutiini, Vidoleini, and Phyxelidini; new genera: *Ambohima* (type species *Ambohima sublima*, new species, from Madagascar), *Kulalania* (type species *Kulalania antiqua*, new species, from Kenya), *Lamaika* (type species *Lamaika distincta*, new species, from South Africa), *Namaquarachne* (type species *Namaquarachne khoikhoiana*, new species, from South Africa), and *Pongolania* (type species *Pongolania pongola*, new species, from South Africa); new species: *Ambohima sublima* and *A. pauliani*; *Kulalania antiqua*; *Lamaika distincta*; *Malaika delicatula*; *Namaquarachne angulata*, *N. khoikhoiana*, *N. thaumatula*, and *N. tropata*; *Phyxelida abyssinica*, *P. anatolica*, *P. apwania*, *P. carcharata*, *P. crassibursa*, *P. eurygyna*, *P. fanivelona*, *P. irwini*, *P. jabalina*, *P. kipia*, *P. malagasyana*, *P. pingoana*, *P. sindanoa*, and *P. umlima*; *Pongolania chrysionaria* and *P. pongola*; *Themacrys ukhahlamba*; *Vidole V. helicigyna*, *V. lyra*, and *V. sothoana*; *Xevioso amica*, *X. aululata*, *X. colobata*, *X. jocquei*, *X. kulufa*, *X. lichmadina*, and *X. orthomeles*. The following new synonymies are proposed: *Haemilla grindleyi* Lawrence with *Malaika longipes* (Purcell); *Haemilla profundissima* Lawrence with *Vidole capensis* (Pocock). The synonymies of *Auximus schreineri* Purcell with *Auximus capensis* Pocock, and of *Haemilla tanganensis* Simon and Fage with *Amphigyrum nebulosum* Tullgren, are rejected. *Themacrys stolida* Simon is considered a nomen dubium.

INTRODUCTION

Spiders of the subfamily Phyxelidinae have been known for more than a century. Reflecting the continuing taxonomic uncertainty regarding generalized cribellate spiders, the spiders herein considered to make up the Phyxelidinae have been treated as belonging to five families: Agelenidae (Koch, 1875; Simon, 1894a, 1895, 1898; Deeleman-Reinhold, 1986), Amaurobiidae (Caporiacco, 1949; Roewer, 1954; Lehtinen, 1967; Brignoli, 1983), Dictynidae (Purcell, 1904; Simon, 1909; Strand, 1909, 1913; Tullgren, 1910; Berland, 1914, 1922; Simon and Fage, 1922; Lawrence, 1937, 1938, 1939, 1964), Psechridae (Simon, 1906), and Tengellidae (Roewer, 1954). The first known phyxelidine was *Tegenaria mirabilis* from Ethiopia, described as an agelenid by L. Koch in 1875. There followed a series of new species described as a result of arachnological explorations in South Africa during the late 19th and early 20th centuries. In 1894 Simon described a cavernicolous phyxelidine, *Phyxelida makapanensis*, from the northern Transvaal in South Africa (Simon, 1894b). Pocock (1900) described two species from South Africa in the genus *Auximus*, and Purcell (1904) described three additional species in the same genus from the southern Cape Province of South Africa. In 1906 Simon described the new genus *Themacrys* in the Psechridae for two species from Natal and Zululand, and

described an additional phyxelidine from near the Cape of Good Hope (*Amaurobius promontorii*) which he placed in the Dictynidae. Beginning in 1909, a series of eastern African species were described from collections made by expeditions to the European colonies in this region during the early part of this century. Simon (1909) described the new genus *Haemilla* in the Dictynidae to accommodate *Tegenaria mirabilis* L. Koch and additional Ethiopian material collected by the Baron M. Maurice de Rothschild and H. Neuville during 1904–1906. In 1910 Tullgren proposed the genus *Amphigyrum* for a new species (*nebulosum*) from Mt. Kilimanjaro, and in 1913 Strand proposed the genus *Amphigyriodes* for the new species *bifoveata* from the Rugege Forest in Rwanda. Berland reported on material collected in German East Africa (1914) and Ethiopia (1922). In 1922 Simon and Fage described *Haemilla tanganensis*, a cave-dwelling species from the coastal regions of Tanga Province in Tanzania. In 1949 Caporiacco recorded a species of *Haemilla* from the Mau escarpment in Kenya. Beginning in the 1930s, Lawrence, who was director of the Natal Museum in Pietermaritzburg, published a series of papers covering the rich South African fauna which he treated as belonging in *Haemilla*. Single new species of *Haemilla* were described in Lawrence (1937) and (1938), and in 1939 the entire South African fauna of *Haemilla* was revised, four new species were described, and the southern and east African species were reviewed and keyed. Lawrence (1964) reviewed the South African cavernicolous spiders, describing two additional species of *Haemilla*: *profundissima* and *grindleyi*. In 1967 Lehtinen published the first modern comprehensive study of the cribellate spiders based on examination of the type specimens of the type species of the majority of the nominate cribellate genera. He proposed and diagnosed the subfamily Phyxelidinae in the Amaurobiidae and made extensive changes in nomenclature. He recognized six valid genera, two previously described (*Phyxelida* Simon and *Themacrys* Simon) and four newly proposed (*Malaika*, *Matundua*, *Vidole*, and *Xevioso*). The first non-African phyxelidine, *Vytfutia bedel* from tropical rainforest in northern Sumatra, was described in the family Agelenidae by Deeleman-Reinhold (1986).

In this study I recognize 53 valid species of Phyxelidinae, of which 36 are newly described, and I also discuss the affinities of an undescribed species from southern Cape Province. Three new tribes, Vytfutiini, Vidoleini, and Phyxelidini, and five new genera, *Ambohima*, *Kulalania*, *Lamaika*, *Namaquarachne*, and *Pongolania*, are proposed.

MATERIALS AND METHODS

Species descriptions represent a single individual of each sex which is noted at the head of each description. The section on variation represents the variability in 3–5 individuals of each sex chosen to represent the full range of overall size. All measurements are in millimeters. The length and width of the cephalothorax and abdomen were measured from above and represent maximum values, chelicerae were excluded from cephalothorax length; carapace height was measured from the side and represents the maximum height; the ocular area was measured from above with the dimensions of the ocular quadrangle being measured from the outer margin of the eyes; the posterior eye row was measured from above and the anterior eye row was measured from in front; clypeal height represents the distance from the median margin of the clypeus to the lower margin of the AME; cheliceral length comprises the distance from the median margin of the clypeus to the apex of the paturon (not including the fang); lengths of leg segments were measured along the dorsal margin as in Griswold (1987a). Spines are reported for the dorsal (d), prolateral (p), ventral (v), and retrolateral (r) surfaces of the legs and palpi and are noted from the proximal to distal ends of each segment. The origin of the calamistrum is represented as the quotient of the distance from the proximal end of the metatarsus to the proximal origin of the calamistrum over the total length of the metatarsus. Abbreviations for the ocular area, legs, and spinnerets are standard for the Araneae. A list of abbreviations used to refer to special morphological features is presented in table 1. Label data are quoted verbatim in the listings of

TABLE 1

Abbreviations for Morphological Terms Used in Text and Figures

AL—alveolus of cymbium
ALS—anterior lateral spinneret
AN—anelli of subtegulum
AO—paired anterior epigynal pockets with sclerotized mesal rim and inconspicuous anterolateral rim (*Pongolania*)
ASD—elongate, blind-ending chamber extending anteriad from bursa copulatrix (*Vidole*)
BH—basal hematodocha
C—conductor
CA—conductor apex
CAF—subapical, rounded flange on the lower (retrolateral) side of CA (*Themacrys*)
CB—flexible base of conductor
CL—basal, transverse sclerotized ridge near connection of conductor to tegulum (*Vidole, Xevioso*)
CO—copulatory opening of epigynum
CTR—transverse retrolateral ridge of conductor (Vidoleini)
CY—cymbium
D—dorsal sclerotized, asetose process of male palpal tibia
DA—posterodorsal, setose sector or process of male palpal tibia
DAS—acutely produced DA (*Xevioso*)
Df—slender, twisted flange produced medially from a hyaline D process (*Xevioso*)
E—embolus
EBA—distal part of forked EBS
EBA1—mesal branch of bipartite EBA
EBA2—lateral branch of bipartite EBA
EBA3—median branch of tripartite EBA
EBM—mesal part of forked EBS
EBS—process distad of the embolic base developed from heavily sclerotized prolateral margin of the tegulum (Vidoleini)
LTR—lateral transverse ridges near anterior margin PML of epigynum (Phyxelidini)
MA—median apophysis of tegulum
MH—median hematodocha
MS—platelike median sclerite arising from soft tegular cuticle (*Matundua*)
P—prolateral condyle of male palpal tibia
PLS—posterior lateral spinneret
PML—posterior median lobe of epigynum
PMP—broad, anterior-directed pocket on PML (*Namaquarachne*)
PMS—posterior median spinneret
PP—pars pendula of embolus
PTP—small swelling or protuberance at embolic base (*Phyxelida*)
R—setose retrodorsal sector of male palpal tibia
R1 + 2—setose retrodorsal sector of male palpal tibia which is longitudinally divided (*Themacrys*)
R1—inner asetose sclerotized ridge of R1 + 2 (*Themacrys*)
R2—outer, setose lobe of R1 + 2 (*Themacrys*)
RL—retrolateral process of male palpal tibia (*Vytfutia*)
SSG—slender, coiled rod encircling outside of spiraled bursa copulatrix (*Xevioso*)
ST—subtegulum
T—tegulum
TA1—small, acutely pointed, basomedian tegular process arising from sector 2 near the margin of desclerotized sector 3 (*Vidole, Xevioso*)
TA2—broad lobate tegular process with rounded apex arising at distal margin of tegulum retrodistad of TA1 and near margin of sector 4 (*Vidole, Xevioso*)
TA3—distad-directed lobate tegular process produced from mesal margin of sector 4 (*Vidole*)
TA3a—conical, ventrad-directed lobate tegular process originating from unsclerotized cuticle of sector 4 (*Matundua, Xevioso*)
TA4—heavily sclerotized, low ridge along distal margin of tegulum extending between TA2 and embolic base (*Vidole, Xevioso*)
TA5—basal, proximad-directed tegular process arising from reduced median sclerotized sector 3 (*Matundua*)

material examined. Tracheae were examined by first dissecting off the dorsal cuticle of the abdomen, digesting away nonchitinous tissue in 10 percent KOH either warmed beneath a desk lamp for 72–120 hours or boiled for 5–10 minutes, and then staining the tracheae and other chitinous structures in chlorazol black. Male palpi were expanded to allow clearer understanding of the relationships between parts. The palpus was immersed in warm 10 percent KOH until expansion began, and then transferred to distilled water

where expansion continued. The procedure was repeated until maximum expansion was attained. To examine the internal female genitalia the epigynum was excised from the abdomen, most tissue obscuring the spermathecae was teased away with fine needles, and the genitalia were transferred to lactic acid for observation. Prior to SEM examination, legs and epigyna were air-dried, and male palpi were critical point dried. Spinnerets were prepared by first causing full extension by squeezing the abdomen with forceps, locking the forceps in position with a paper clip, and transferring the spider and forceps to absolute ethanol for 24 hours. The apex of the abdomen with spinnerets was then cut off, critical point dried, and mounted on a stub using colloidal graphite. Specimens were examined with Wild M5 or M5A stereomicroscopes, and drawings were made with a mounted phototube (camera lucida). An Olympus compound microscope was used to examine the internal structure of the spermathecae. Photomicrographs were made with a Cambridge Stereoscan S250 scanning electron microscope.

For the character analysis I examined a great variety of amaurobioid, dictynoid, and lycosoid species. *Amaurobius fenestralis* (Stroem) is the type species of the type genus of the Amaurobiinae and is therefore an appropriate exemplar taxon for the PAUP analysis. Nevertheless, outgroup comparison for the Phyxelidinae was by no means confined to a single exemplar taxon. In the course of this study a large number of amaurobioid, dictynoid, and lycosoid spiders were examined. Whenever possible (i.e., when both sexes are known) I evaluated all external characters which were subsequently used in the matrix for *Amaurobius fenestralis* plus the Phyxelidinae. This permitted a better understanding of phyxelidine characters, and allowed me to determine which are unique to the Phyxelidinae. A list of these taxa is presented in Appendix 1. Unfortunately, in many cases (e.g., in types) it was not possible to examine the structure of the internal female genitalia, and therefore the generality of the character states for the internal female genitalia of the Phyxelidinae is not as well established as for external characters.

The cladistic relationships among the species of the Phyxelidinae were estimated using D. L. Swofford's program PAUP (Phylogenetic Analysis Using Parsimony) version 2.4.1. An initial data set for 55 taxa and 101 characters was scored. Because the maximum number of taxa permitted by this version of PAUP is 50, the number of taxa was reduced by eliminating all taxa which were identical for all character states. This gave 47 as the final number of taxa. In accordance with Swofford's suggestions, all characters which were invariant over the data set, or were autapomorphies, were eliminated. Because of the removal of eight taxa, five characters were rendered invariant or autapomorphic, leaving a final data matrix of 47 taxa × 96 characters. All multistate characters were treated as unordered. Missing or nonapplicable data were coded as 9. As many of the phyxelidines are known from only one sex (5 known only from males, and 20 only from females) the data matrix has a large number of missing or nonapplicable entries (nearly 10% of the data matrix was coded as 9). Runs were done on an AT&T 6300 PC with 8086 processor and 8087–2 math coprocessor, a hard disk, and 640K (kilobytes) of RAM (random access memory) operating under MS-DOS version 2.11.

A series of runs were done as suggested by Platnick (1987), who found that the reliability of finding a shortest tree was affected by varying the addition sequence option and the number of trees that were held at the end of each step. For each data set the following options were selected: four addition sequence parameters (CLOSEST, SIMPLE, ROOTLESS, ASIS) and six HOLD values (1, 5, 10, 15, 20, 25) giving a total of 24 combinations. Therefore, for each data set, 24 runs were necessary. At the end of each run, all equally parsimonious trees (up to PAUP's maximum value of 100) were saved. Farris optimization, global branch-swapping, the MULPARS option, and outgroup rooting using *Amaurobius fenestralis* were specified. At the end of each set of 24 runs, a strict consensus tree (representing only those components found universally in all trees of the shortest length) of all of the shortest trees saved (as many as 2300 in one case) was calculated.

For 47 taxa and 96 characters the various combinations of options gave 100 trees of

175 steps 21 times, totaling 2100 equally parsimonious trees. Three other runs gave 200 trees of 177 steps and 100 trees of 180 steps. The strict consensus tree for the 2100 equally parsimonious trees had 13 components (topologies found all 2100 times) and 17 unresolved taxa arising from a basal polychotomy. I think that the vast number of equally parsimonious trees may be due to PAUP's treatment of missing data. The missing code is interpreted as all possible states. Therefore, if PAUP may imagine many different states, many trees are possible. Some trees have topologies supported by imaginary states which go far beyond the data at hand. As the resolution offered by the strict consensus tree for 47 taxa and 96 characters was poor, subsets of the entire data set were run separately in the same set of combinations described. A data set for males only, including 31 taxa and 72 characters, was run. Each run found 25 trees of 149 steps. The strict consensus tree was well resolved, having 28 components and only 2 polychotomies.

A data set for female characters only, having 41 taxa and 30 characters, was run. A total of 2300 trees of 48 steps was found. The strict consensus tree was poorly resolved, having only 14 components. Fourteen taxa arose from a basal polychotomy. Finally, a data set for only those taxa for which both sexes were known was run. There were no missing entries, though data for some characters were not applicable. This data set had 29 taxa and 96 characters. PAUP found 18 trees of 152 steps 21 times. The strict consensus tree had 24 components, no basal polychotomies, and only 2 polychotomies in the middle section of the tree.

To approach a fully-resolved cladogram for the Phyxelidinae, the strict consensus trees for each data set were examined and the components tabulated. Components were then compared and could be unique or repeated and contradicted or uncontradicted. Components which were unique or repeated and were uncontradicted were taken as representing the best estimate of the true phylogeny of the Phyxelidinae. No contradictions were found in comparing the consensus trees for the data sets for both sexes (data missing for one or the other sex), males only, and both sexes with no data missing for either sex. Contradictions came only when comparing the consensus tree for females only to the other three consensus trees. At this point I continued the analysis by hand. Characters bearing on the resolution of conflicts (through contradiction of components) or resolution of polychotomies were scored and their consistency ratios were tabulated. The most parsimonious solution to each case was preferred. In cases in which more than one solution was found to be equally parsimonious, the resolution supported by character(s) with higher consistency was preferred. For example, the arrangements of nested sets [Vytfutiini (Phyxelidini, Vidoleini)] and [(Vytfutiini, Phyxelidini) Vidoleini] are equally parsimonious, but the former is supported by a character (loss of retrolateral process on male palpal tibia) which had consistency indices in the PAUP runs ranging from 0.50 to 1.00, while the latter was supported by a character (clasping spine on male metatarsus I) which always had a consistency index less than 0.33. Finally, the preferred tree was coded and input into PAUP and its length calculated to be 175 steps with a consistency index of 0.589, as short as any tree ever found for that data set. Character state changes on this tree were tabulated, and some characters were recoded to reduce redundancy and eliminate logical inconsistencies, slightly reducing the number of steps required. This is why although five characters are added on the final cladogram, this cladogram is only three steps longer than the PAUP tree. The topology of this PAUP tree was used as the basis for a final cladogram. Eight taxa and five characters were added to form a final matrix of 55 taxa and 101 characters (Appendix 2). The cladogram for this matrix requires 178 steps with a consistency index of 0.618. The final cladogram is presented as six figures (figs. 13, 20, 31, 50, 69, and 81). The branch for the working outgroup, *Amaurobius fenestralis*, with its three character state changes, is not included in the figures.

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NMSA Natal Museum, Pietermaritzburg, Mr. P. M. C. Croeser
NRS Naturhistoriska Riksmuseet, Stockholm, Dr. T. Kronestedt
RMNH Rijksmuseum van Natuurlijke Historie, Leiden, Dr. P. J. van Helsdingen
SAM South African Museum, Cape Town, Dr. V. Whitehead and Mrs. M. Cochrane
TMP Transvaal Museum, Pretoria, Mrs. L. Brown and Mr. W. Haacke
UCB University of California, Berkeley, Dr. E. I. Schlinger
ULM Université des Sciences et Techniques du Languedoc, Montpellior, Dr. R. Legendre
UUZM Zoologiska Institutionen, Uppsala Universitet, Uppsala, Dr. Å. Holm
ZMB Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität, Berlin, Dr. M. Moritz
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NATURAL HISTORY

The Phyxelidinae includes the commonest cribellate spiders in southern Africa, and, judging from material in collections, in eastern Africa as well. Phyxelidine spiders occur from sea level to approximately 2500 m in South Africa, but in tropical Africa they appear to be restricted either to montane habitats above 2000 m or to caves. They are apparently restricted to places of even temperature and high humidity. Retreats are built beneath logs (fig. 1c), stones, and other debris, under bark or deep in holes in trees (fig. 1a), deep in clefts in boulders and rock faces, and in caves. Except for the troglobitic species they appear to be strictly nocturnal, emerging to the opening of their retreats at night (fig. 1a). All species appear to build webs. When the retreats are located beneath boulders or logs the commonest form of web is an irregular tangle which covers the surrounding substrate (fig. 1c). When spiders occupy retreats in holes in trees, logs, or clefts in rocks, the web radiates out onto the substrate from the mouth of the retreat (fig. 1a). When the spider occupies a large enclosed space, such as in a cave, the web may take the form of series of sheets of cribellate trap webbing. I have observed *Themacrys silvicola* in a small cave with a web consisting of a series of cribellate sheets ranging from 6 to 20 cm in greatest length which were close to the cave walls.

Phyxelidine females make spherical or oval egg sacs with an outer covering of several layers of ordinary silk. Bits of dirt and debris may be incorporated into the covering of the egg sac. The egg sac is attached to the substrate, and the female remains with it. It is not known if females remain with the eggs until they hatch. A female of *Matundua silvatica* was collected with an egg sac beneath a log in January at Diepwalle, near Knysna in the coastal region of southern Cape province. Forty-six young subsequently hatched from the egg sac. A gravid female *Xevioso amica* was collected at Lake St Lucia in Zululand in June and made an egg sac containing 41 eggs. Another female *Xevioso amica* was collected at Lake St Lucia in November with an egg sac containing 85 eggs. The egg sac found in September with a female of *Xevioso amica* from Empangeni, Zululand, contained 100 eggs.

Courtship behavior in the Phyxelidinae has not been recorded. The striking modifications of the first metatarsi of males (figs. 7b–d, 8a, 101a–c) in most genera suggest that males clasp females during courtship and/or copulation with their modified first legs. Presumably males of *Ambohima sublima* (figs. 66a–d) clasp females with both the first and second legs. The universal occurrence of pick- or thornlike modifications of the basal prolateral setae of the palpal femora of both sexes (figs. 4a–f, 5a–f) and frequent occurrence of spinules (figs. 7e, f) and striae (fig. 49c) on the chelicerae of males suggest that stridulation plays an important role in communication among these spiders.

Prey remains found in webs in the field included beetles, crickets and other orthoptera, and millipedes. During the course of this study, several hundred juvenile spiders were reared to maturity through one or more molts on a diet of vinegar flies (*Drosophila melanogaster*), mealworms (larvae of *Tenebrio molitor*), and meal moth (*Plodia interpunctella*) larvae.

Information on the natural history of in-

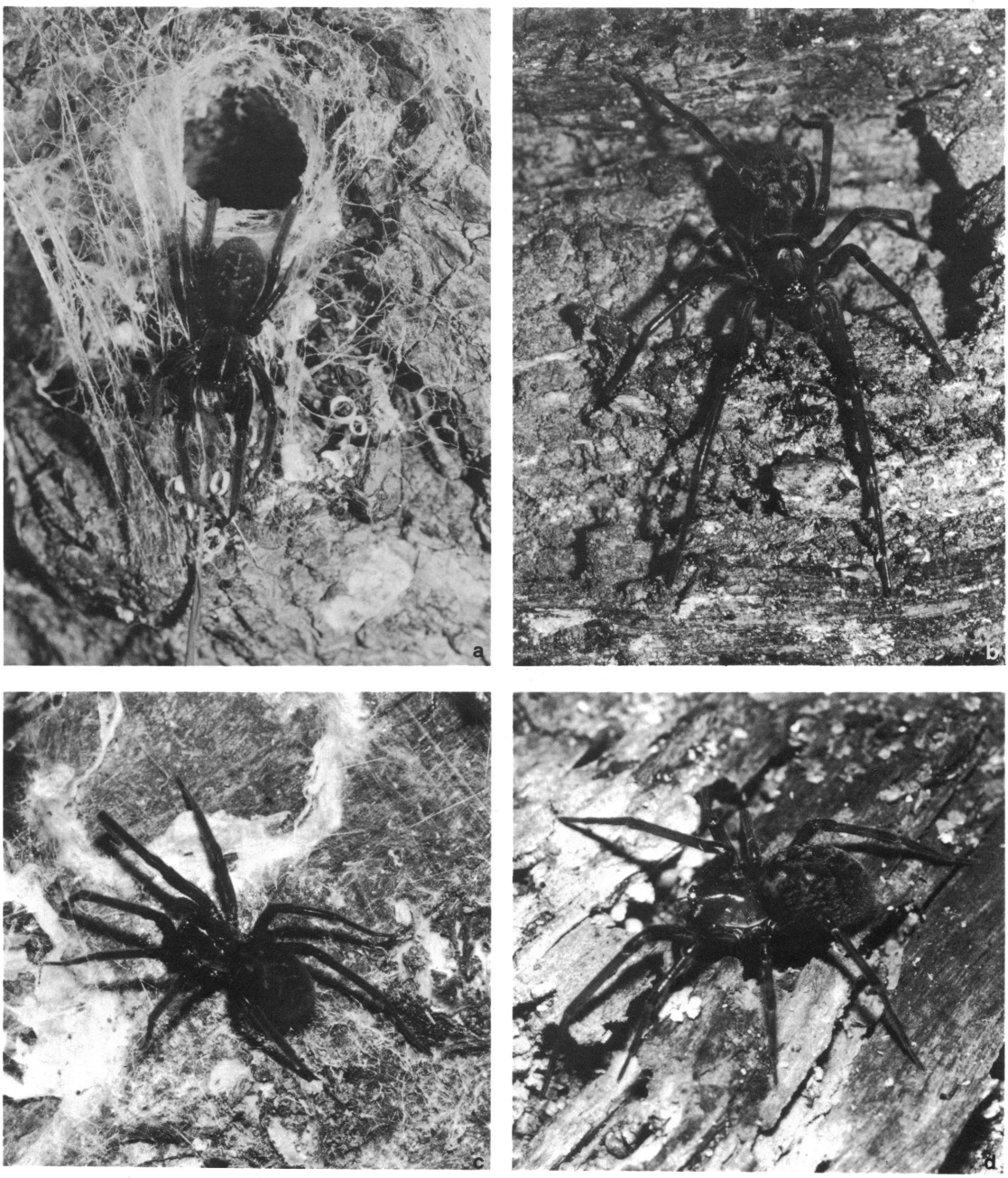

Fig. 1. Phyxelidinae females. **a.** *Vidole capensis* (Pocock), Buffels Bay. **b, d.** *Themacrys silvicola* (Lawrence), Town Bush. **c.** *Matundua silvatica* (Purcell), Diepwalle.

dividual species is available from label data, published accounts, or through my own observations for about 50 percent (29/53) of the known species. This is detailed in each species description. Most appear to be restricted to a single type of habitat, though some (i.e., *Vidole capensis*) are notable for their broad habitat tolerances. The majority of species

occur in forest or in closed canopy bush (i.e., *Kulalania antiqua*, *Lamaika* distincta, *Malaika longipes*, *Matundua silvatica*, *Namaquarachne tropata*, *Phyxelida bifoveata*, *P. carcharata*, *P. jabalina*, *P. kipia*, and *P. sindanoa*, *Themacrys* irrorata, *T. monticola*, and *T. silvicola*, *Vidole capensis* and *V. lyra*, *Vytfutia bedel*, *Xevioso amica*, and *X. kulufa*). Several species of *Phyxelida* appear to be restricted to caves (*P. anatolica*, *P. makapanensis*, *P. pingoana*, and *P. tanganensis*), and *Themacrys cavernicola* may also be an obligate troglobite. There appear to be no special adaptations to cave life shown by these species, for, except for the slightly reduced (but apparently fully functional) eyes of *Phyxelida makapanensis*, each obligately troglobitic species is little different from its epigean sister taxa. The extremely long legs of *T. cavernicola* may be an adaptation to cave life, though some individuals of its sister species *T. irrorata* have legs which are relatively as long as those in *T. cavernicola*. Several other species may facultatively occur in caves (*Malaika longipes*, *Namaquarachne tropata*, *Phyxelida apwania*, *Themacrys silvicola*, and *Vidole capensis*). Three species (*Themacrys irrorata*, *Vidole sothoana*, and *Xevioso orthomeles*) are recorded from open thorn bush and savanna, but none is restricted to this habitat. *Vidole sothoana* also occurs in highveld grassland, and *Themacrys monticola* in montane grassland. *Namaquarachne khoikhoiana* appears to be restricted to montane fynbos, and *Vidole capensis* occurs in both coastal and montane fynbos. *Vidole schreineri* appears to be the only species of Phyxelidinae which unequivocally occurs in desert (although *Namaquarachne angulata* and *N. thaumatula*, for which no ecological data are available, probably also live under desert conditions in northern Namaqualand), and is restricted to the arid karroo of South Africa.

PHYLOGENETICS

THE FAMILIAL PLACEMENT AND SISTER GROUP OF THE PHYXELIDINAE

The familial placement of the Phyxelidinae is problematical, and has a long and varied history. The spiders herein considered as Phyxelidinae have been classified as Agelenidae, Dictynidae, Psechridae, Tengellidae, and Amaurobiidae. Lehtinen (1967) was the first to consider the genera *Malaika*, *Matundua*, *Phyxelida*, *Themacrys*, *Vidole*, and *Xevioso* as members of one taxon, the subfamily Phyxelidinae, which he considered as a subfamily of the Amaurobiidae. The most recent family placement of a phyxelidine was that of Deeleman-Reinhold (1986), who placed the new genus *Vytfutia* in the Agelenidae.

HISTORY AND CRITIQUE OF THE TAXONOMIC PLACEMENT OF THE PHYXELIDINES

The original family placement of a phyxelidine, *Tegenaria mirabilis* L. Koch, was in the classic Agelenidae (Koch, 1875). Presumably Koch based his decision on the superficial resemblance of the Ethiopian *T. mirabilis* to the well-known European species of *Tegenaria*. Subsequently the majority of phyxelidine taxa were described in either the Dictynidae or Amaurobiidae, though each family name referred to essentially the same taxonomic concept. The name Amaurobiidae was proposed by Thorell (1869–1870: 121) as a subfamily of the classic Agelenidae, and the name Dictynidae was proposed by F. O. P.-Cambridge (1871: 213) for the genus *Dictyna*. Simon (1892: 231) treated *Dictyna* and all the taxa of Thorell's Amaurobiidae as members of one family, the Dictynidae, a move which Leech (1972: 14) considered inexplicable. The majority of workers followed the opinion of Simon, considering one large family Dictynidae as constituting the bulk of the generalized cribellate spiders with three claws and without claw tufts. Petrunkevitch separated the Amaurobiidae from the Dictynidae on the basis of the former having tarsal trichobothria (Petrunkevitch, 1928: 21). He (Petrunkevitch, 1928) considered the genera *Amphigyroides*, *Amphigyrum*, *Haemilla*, and *Phyxelida* as members of the Amaurobiidae without argumentation, and incor-

rectly, as they lack tarsal trichobothria. Lehtinen (1967) was the first to combine all previously described phyxelidine taxa, including *Themacrys*, in the new subfamily Phyxelidinae of the Amaurobiidae. A critical evaluation of this familial placement is in order. The definition of the family Amaurobiidae is fraught with problems. At a minimum, any taxon assigned to the Amaurobiidae should be demonstrably related to the type genus of the family *Amaurobius* C. L. Koch 1837. Such a relationship can only be supported by the presence of one or more synapomorphies, and thus the problem of definition of the Amaurobiidae becomes one of discovering synapomorphies. The Amaurobiidae has been recently defined for geographically constrained groups of taxa (e.g., Leech, 1972, for the Nearctic Region, and Forster and Wilton, 1973, for New Zealand) but neither study considered the largely African phyxelidines. The most recent attempt to define the Amaurobiidae for the whole world was that of Lehtinen (1967). Whereas his table 8 (1967: 310) purports to give a series of 19 characters to diagnose the Amaurobiidae from the Miturgidae, Liocranidae, Agelenidae, Dictynidae, and Hahniidae (the other families which he placed in his Amaurobioidea), his treatment suffers from a vagueness of character definition and lack of phylogenetic argumentation which renders the monophyly and diagnosis of the Amaurobiidae virtually impossible. Of the 19 standard characters (from top to bottom) in Lehtinen's table 8 (1967: 310), detailing the families of his superfamily Amaurobioidea, the states of 17 are not unique to the Amaurobiidae (the 19th, epigynal structure, was considered by Lehtinen to be too variable to be of use at this high taxonomic level): 1. cribellum very variable, colulus usually unpaired; 2. spinnerets with basic pattern; 3. abdomen with basic pattern; 4. carapace unmodified; 6. leg spination of basic pattern; 7. feathery hairs present or absent; 8. absence of a trochanteral notch; 9. calamistrum a single row; 10. three tarsal claws; 11. claw tufts absent or indistinct; 12. ventral scopulae weak or indistinct; 13. basic pattern of tarsal trichobothria; 14. palpal tibia with processes, patella unarmed; 15. embolus of basic pattern, variously modified; 16. primary conductor present; 17. secondary conductor usually present, and 18. median apophysis usually present.

Could any of these character states be synapomorphies for Lehtinen's Amaurobiidae plus one or more of his other amaurobioid families? The character state BP (basic pattern) recorded for characters 2, 3, 6, 13, and 15 appears to be an explicit statement of symplesiomorphy. When the character states for the remaining 12 characters are compared to the states in Lehtinen's (1967: 307) table 7, representing his Amaurobiides, Sparassoidea, and all isolated families, it can be seen that the states for character 1 (presence of a cribellum), 7 (feathery hairs), 8 (trochanteral notch), 10 (3 tarsal claws), 13 (tarsal trichobothria in 1 row), 16 (primary conductor present), 17 (secondary conductor present), and 18 (median apophysis present) are so widely distributed they are best considered plesiomorphies for the Amaurobiidae or so variable in the in- and outgroups that their homology at this level is dubious. Of the remaining five characters from Lehtinen's table 8, characters 11 (absence of claw tufts) and 14 (palpal tibia with processes, patella unarmed) occur widely within the Lycosoidea (Lehtinen, 1967: 371, table 40), 12 (absence of scopulae) is stated to be primitive (Lehtinen, 1967: 282), and 4 (absence of trends in carapace modification) is so vaguely defined as to be worthless. Of the 18 characters listed in Lehtinen's (1967) table 8, none which are shared with other families can be considered to be synapomorphies for those taxa, and all but character 5 (chelicerae with long groove and an increase in the number of teeth) can readily be rejected as synapomorphies for the Amaurobiidae. The latter character, while unique to Lehtinen's Amaurobiidae, is again not precisely defined, but perusal of Lehtinen's (1967: 322–323) table 13 reveals that some subfamilies (e.g., Matachiinae) do not have this character state, whereas only one (Macrobuninae) is scored as having the cheliceral groove long and armed with numerous teeth. Nor is this character state found in the nominate subfamily [the type species of the type genus of the Amaurobiinae, *Amaurobius fenestralis* (Stroem), has three large retromarginal and four heterogeneous promargin-

al teeth on the cheliceral fang furrow]. Clearly, the most recent comprehensive attempt to define the Amaurobiidae has failed due to vagueness of character definition and lack of phylogenetic reasoning.

Simon (1906) described the genus *Themacrys* in the family Psechridae without clear argumentation. The reasoning behind this placement is unclear, because Simon defined the Psechridae as those spiders with the combination of well-developed tarsal claw tufts and an unpaired inferior tarsal claw (Simon, 1892: 224). *Themacrys* has no such claw tufts. *Themacrys* was transferred to the Tengellidae by Petrunkevitch (1928: 91), again without argumentation, but possibly he recognized the absence of claw tufts in *Themacrys* as excluding that genus from the Psechridae. This placement was followed by Gerhardt and Käestner (1938: 647), Roewer (1954), and Bonnet (1959). Placement of any members of the Phyxelidinae in the Psechridae is unwarranted, as no phyxelidines possess the synapomorphies of the Psechridae (Levi, 1982): claw tufts and a toothed median claw, and a calamistrum consisting of 3–4 rows of short, equal, distally curved setae.

Deeleman-Reinhold (1986) described the phyxelidine *Vytfutia bedel* as an agelenid. She admitted at the outset that assignment of *Vytfutia* to a family is "full of pitfalls." She believed that assignment to the Amaurobiidae (sensu Forster and Wilton, 1973) was precluded due to the conformation of the median apophysis of the palp. Presumably this referred to the fact that in *Vytfutia* the median apophysis (fig. 100a, c) is slender and only lightly sclerotized rather than the heavily sclerotized, platelike form of the median apophysis which Forster and Wilton (1973) used to define the Amaurobiidae for the New Zealand fauna. Whereas the presence of a heavily sclerotized, platelike median apophysis may define a subgroup of the Amaurobiidae, absence of this character does not necessarily preclude a relationship to the Amaurobiidae. Deeleman-Reinhold rejected a relationship to the Phyxelidinae (1986: 36) because she thought that the modification of male metatarsus I was structurally different and did "not reflect true relationship." This statement is inexplicable, as the retrolateral clasping structure on the first metatarsus in *Vytfutia* (fig. 101a–c) and most Phyxelidini (figs. 8a, 54a–d, 59c–e) is virtually identical (though *Vytfutia* has an additional autapomorphic dorsomedian spur) and such a structure is apparently unique within the Araneomorphae. *Vytfutia* was provisionally assigned to the Agelenidae, presumably due to its possible relationship with *Mahura* Forster and Wilton. Assignment of this, or any other, taxon to the Agelenidae presupposes that it is demonstrably related to the type genus of that family, i.e., *Agelena* Walckenaer. This requires that one or more synapomorphies for *Agelena* plus *Vytfutia* be identified. The Agelenidae has performed for three-clawed ecribellate spiders much the same function as the Amaurobiidae has for the three-clawed cribellates: a dumping ground for obscure and undistinguished forms. Not surprisingly, identification of a synapomorphy for the Agelenidae is difficult, but I think that Lehtinen (1967: 401) has proposed just such a character. He stated that all true agelenids (including the genus *Agelena*) have a typical paired colulus consisting of two, more or less protruding, obtusely triangular plates. I have examined many genera of Agelenidae and found this character to be a conspicuous and consistent synapomorphy for this group. *Vytfutia* has a divided cribellum, and therefore does not share this apomorphy with the Agelenidae. In the absence of any demonstrable synapomorphy with another group of spiders, the possession of a unique retrolateral metatarsal clasping device (fig. 101a–c) clearly allies *Vytfutia* with the Phyxelidinae.

It is evident that all previous attempts to classify members of the Phyxelidinae have suffered from lack of explicit argumentation, vagueness of definition, and especially failure to distinguish whether character states shared by the phyxelidines and other taxa are symplesiomorphies or synapomorphies. The crucial task in the placement of the Phyxelidinae is to identify synapomorphies for this subfamily and other taxa. I will argue that such synapomorphies exist with *Amaurobius* and that the Phyxelidinae should be considered a subfamily of the Amaurobiidae.

CHARACTER ANALYSIS FOR THE PHYXELIDINAE AND AMAUROBIIDAE

With regard to the high-level taxonomic question of the familial relationships of the Phyxelidinae I believe that four character systems warrant consideration: the nature of the cribellum, the presence, form, number, and position of processes on the tibia of the male palp, the pattern of tarsal and metatarsal trichobothria, and the form of the tracheal system.

CRIBELLUM: It is well-established (Lehtinen, 1967; Platnick, 1977: 7) that the cribellum is plesiomorphic for the Araneomorphae. Comparison of the sister microorders Palaeocribellatae and Neocribellatae (Forster et al., 1987) reveals that an undivided cribellum, occurring in both microorders, is plesiomorphic, implying that a divided cribellum is apomorphic (Coddington, in press). Accordingly, there may be a monophyletic subgroup of the Neocribellatae defined by the synapomorphy of a divided cribellum. Among those taxa with a divided cribellum is the Phyxelidinae (fig. 2a), and therefore we should search for their nearest relatives among those taxa with a divided cribellum, or some modification thereof.

PALPAL TIBIAL PROCESSES: The presence of apical, aspinose processes on the male palpal tibia is presumably derived, as no such processes are found in the Palaeocribellatae (Forster et al., 1987) whereas they may be present or absent in the Neocribellatae (Coddington, in press). The homology of particular palpal tibial processes is yet to be established, but a reasonable criterion would be position (e.g., basal, proximal, distal or apical, retrolateral, dorsal, ventral, or prolateral). The presence of both proximal and distal processes in the same male (e.g., some Metaltellinae, i.e., *Metaltella* Mello-Leitão and *Exlinea* Lehtinen) and of lateral, dorsal, and ventral processes in the same male (e.g., *Amaurobius fenestralis*) suggest that processes which occur in different positions on the palpal tibia may be treated as nonhomologous, i.e., separate characters. They fail the conjunction test for homology (Patterson, 1982: 38).

Within the Neocribellatae, apical aspinose tibial processes are consistently absent at least in the Austrochiloidea (Forster et al., 1987), Palpimanoidea [palpal tibial processes are altogether absent in the Archaeidae, Pararchaeidae, Palpimanidae, Huttoniidae, Micropholcommatidae (including Textricellidae), and Mimetidae, and the Mecysmaucheniidae and Holarchaeidae have only spinose processes—Forster and Platnick, 1984; the Stenochilidae have only proximoventral processes—Platnick and Shadab, 1974]; Dysderoidea (Orsolobidae—Forster and Platnick, 1985; Segestriidae—Beatty, 1970; Dysderidae—Cooke, 1966; and Oonopidae-e.g., Chickering, 1968, 1969), Scytodoidea (Filistatidae—Simon, 1893: 258; Sicariidae sensu latu—Simon, 1893: 263), and Oecobioidea (Lehtinen, 1967: 285, fig. 6). Among the orb-weaving spiders of the Orbiculariae (sensu Coddington, 1986b, including the Deinopidae and Uloboridae) processes on the male palpal tibia occur sporadically. In the Uloboridae modifications of the male palpal tibia occur only in the genera *Miagrammopes* F. O. P.-Cambridge and *Sybota* Simon. These processes do not closely resemble the sclerotized apical processes of interest to this discussion, and indeed, Opell (1979) considered the processes in *Miagrammopes* and *Sybota* as synapomorphies for those genera, implying nonhomology with the tibial processes in other spiders. Processes on the male palpal tibia are absent in the majority of the families of the Orbiculariae: Deinopidae (Lehtinen, 1967); Theridiosomatidae (Coddington, 1986a); Symphytognathidae (Forster and Platnick, 1977); Mysmenidae (Brignoli, 1980); Cyatholipidae (Griswold, 1987c); Theridiidae (Levi and Levi, 1962); Tetragnathidae (Simon, 1894a: 709); and Araneidae (according to Simon, 1895: 762, these are without a true process, but occasionally with a ventral swelling or lobe; e.g., Levi, 1971). Those orbicularian families in which male palpal tibial processes do occur, such as the Anapidae (sporadically, e.g., Platnick and Shadab, 1978; Brignoli, 1981) and Linyphiidae (generally present at least in the Erigoninae, e.g., Jocqué and Scharff, 1986; Millidge, 1984), are nested within the cladogram of the Orbiculariae (Coddington, 1986b: fig. 12.26), suggesting that the absence of palpal tibial processes is probably plesiomorphic for the

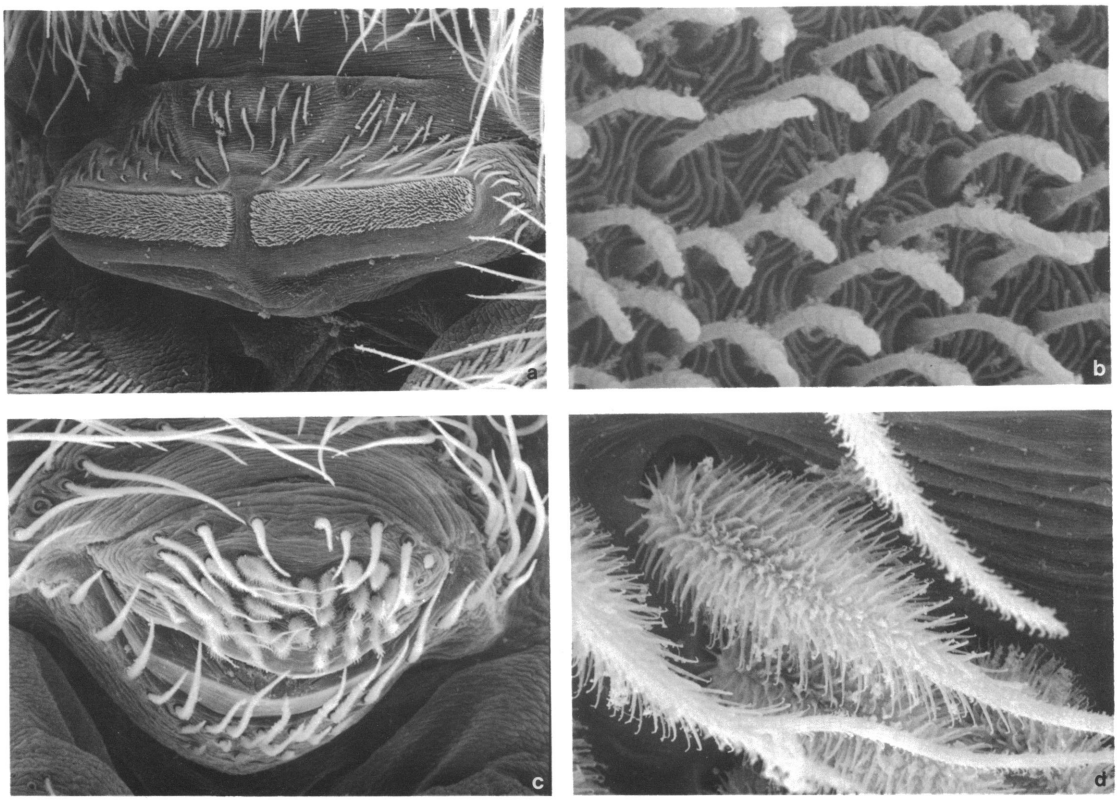

Fig. 2. *Namaquarachne tropata*, new species, Grootvadersbosch, female, abdomen. **a.** Divided cribellum. **b.** Close-up of cribellar spigots. **c.** Anal tubercle (posterior at top). **d.** Setae on anal tubercle.

Orbiculariae, and their presence in these families must be considered homoplasy. It would seem then that the basic plan of the Araneoclada (Platnick, 1977) does not include processes on the male palpal tibia, and that where such processes are found they may be considered apomorphies. Lehtinen (1967) recorded apical tibial processes in and suggested (fig. 6, p. 285) that these are primitive (and hence synapomorphic at this level) for a group containing at least his Amaurobiides (Gnaphosoidea, Lycosoidea, Amaurobioidea, Sparassoidea, and Pisauroidea) and Zodariides (Eresoidea, Zodarioidea, Salticoidea, and Thomisoidea). Perusal of the literature and examination of specimens reveal that in all of these taxa the tibial process is almost always retrolateral, and in those taxa in which more than one process occurs, invariably one is retrolateral. Dorsal, prolateral, and ventral processes show a much more restricted distribution. The distribution of retrolateral tibial processes is broader within the Araneoclada than that of the divided cribellum, and accordingly may define a monophyletic group of greater inclusivity. Virtually all of the taxa with divided cribella also have retrolateral tibial processes, though there are notable exceptions (e.g., Titanoecidae). A retrolateral tibial process on the male palp occurs in one member of the Phyxelidinae (i.e., *Vytfutia bedel*: fig. 100b, c), and I reason that a retrolateral tibial process is part of the groundplan of the Phyxelidinae. Therefore their nearest relatives should be among those taxa with a retrolateral tibial process.

An additional dorsal tibial process shows a much more restricted distribution within the Araneoclada and accordingly is probably derived wherever found. A dorsal tibial process occurs rarely in the Gnaphosoidea, e.g., *Legendrena* and *Gallieniella* in the Gallieniellidae (Platnick, 1984) and in *Cithaeron* in the Cithaeronidae (Simon, 1893); in *Megad-*

ictyna in the Nicodamidae, where it is median rather than apical (Forster, 1970: 182), and in some Miturgidae Uliodoninae (e.g., *Uliodon hawkesi* Hogg, personal obs.). Of the above taxa, *Legendrena* and *Cithaeron* lack a retrolateral process (but a retrolateral tibial process is found generally in the Gnaphosoidea), and *Megadictyna* has only the dorsal process. A simple, sclerotized dorsal tibial process occurs in addition to a retrolateral process in several of the taxa which Lehtinen (1967) included in his Amaurobiidae, i.e., some Macrobuninae (e.g., *Auximella harpagula* Simon, *Myropsis chilensis* and *M. backhauseni* Simon, *Porteria albopunctata* Simon, *Retiro procerulus* (Simon), *Rubrius major* (Simon), personal obs.; see also Roth, 1967), apparently all Amaurobiinae (Lehtinen, 1967: 445; Leech, 1972; also personal obs. of *Amaurobius fenestralis* (Stroem), *Callobius bennetti* (Blackwall), *Callioplius hoplites* (Bishop and Crosby), and *Walmus latescens* Chamberlin), and each tribe of the Phyxelidinae. It is virtually identical in *Amaurobius*, *Vytfutia* (fig. 100b, c), *Matundua* (fig. 18a, b), and *Malaika* (fig. 61a, b). The sporadic occurrence of a dorsal tibial process in members of the well-defined Gnaphosoidea (Platnick, 1984) is probably not homologous to that found in Lehtinen's Amaurobioidea, though the highly derived nature of the Gnaphosoidea makes comparison with cribellate spiders difficult and often inconclusive. The dorsal process occurs in some of the most plesiomorphic members of the Gnaphosoidea (i.e., Gallieniellidae) and, in the absence of a sister-group hypothesis for the Gnaphosoidea, the presence or absence of a dorsal tibial process in the ground plan of the Gnaphosoidea is equivocal. But the "dionychan" condition of the Gnaphosoidea (i.e., the loss of the inferior tarsal claw and its replacement by tufts of specialized setae) may well be a synapomorphy for the Gnaphosoidea and other dionychan groups (e.g., Clubionidae, Salticidae). To suggest that the dorsal tibial process of Gnaphosoidea is homologous with that of the Amaurobiidae would then require additional instances of parallelism in the development of the dionychan condition and transformation of the cribellum into a colulus, and, for this reason, I consider the dorsal processes in the Amaurobiidae and Gnaphosoidea nonhomologous. The nonapical position of the dorsal tibial process in *Megadictyna* suggests that this is also not homologous to that found in Lehtinen's Amaurobioidea. The homology of the uliodonine dorsal tibial process with that in Lehtinen's Amaurobiidae (i.e., Amaurobiinae, Phyxelidinae, and certain Macrobuninae) is a possibility. But the amaurobiids share the apomorphic divided cribellum with many other taxa which lack a dorsal tibial process, whereas those Miturgidae which retain a functional cribellum (e.g., *Uduba inhonesta* Simon and *U. funerea* Simon; Lehtinen, 1967: 316, table 9; 319, table 13) have the plesiomorphic undivided state. As Miturgidae also has apomorphies (e.g., notched trochanters and tarsal trichobothria in two or more rows) not shared with the amaurobiids, it is likely that the dorsal tibial process has arisen in parallel in the Miturgidae and in the aforementioned amaurobiid taxa. Finally, Titanoecidae has a large, elaborately folded, dorsal to prodorsal tibial process (personal obs.; Lehtinen, 1967, fig. 425–427, 430, 438) and lacks a retrolateral process. Because this family also has the presumably derived divided cribellum, the potential homology of the dorsal tibial process with that in Lehtinen's Amaurobiidae deserves further discussion (see below).

TRICHOBOTHRIAL PATTERN: Outgroup comparison with the Hypochiloidea and Austrochiloidea (Forster et al., 1987) suggests that a pattern of two rows of dorsal trichobothria on the tibia, one subapical dorsal trichobothrium on the metatarsus and no trichobothria on the tarsus is primitive for the Araneoclada. A similar conclusion was reached by Lehtinen (1980), who called this trichobothrial pattern "type 1." Therefore, an increase in the number of trichobothria on the metatarsi and appearance of trichobothria on the tarsi may be considered apomorphic. Coddington (in press) suggested that rows of trichobothria on the tarsi and metatarsi are derived and constitute a synapomorphy for the Amaurobioidea (sensu Forster and Wilton, 1973), and therefore a row of tarsal trichobothria must be part of the ground plan of the Amaurobiidae. The phyxelidines show a trichobothrial pattern (fig. 15a) equivalent to the "type 1" of Leh-

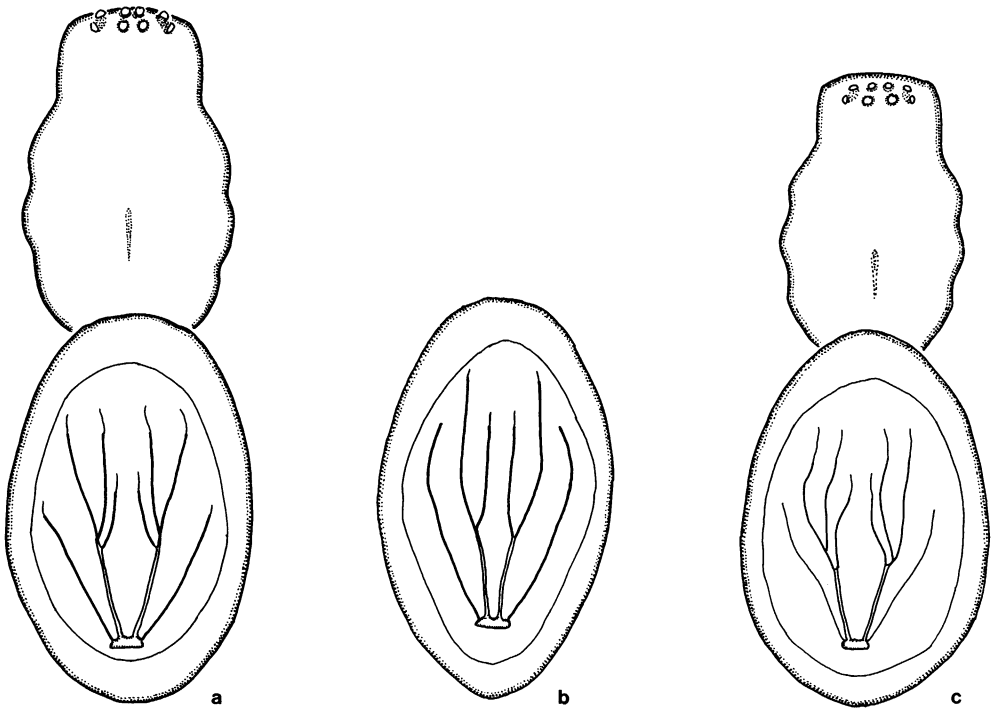

Fig. 3. Phyxelidinae, females, tracheae. **a.** *Vidole capensis* (Pocock), Buffels Bay. **b.** *Malaika longipes* (Purcell), Skeleton Gorge. **c.** *Matundua silvatica* (Purcell), Diepwalle.

tinen (1980), and therefore as an initial hypothesis this must be considered plesiomorphic. But if the phyxelidines are considered to be a subclade of the Amaurobiidae, the polarity interpretation changes and the absence of tarsal trichobothria and presence of but a single subapical metatarsal trichobothrium must be considered as a reversal to the plesiomorphic state. Alternatively, if the sister group of the Phyxelidinae is within the Austrochiloidea, such a reversal in the trichobothrial character need not be postulated. Placement in the Austrochiloidea would involve parallelisms for the characters of the Araneoclada and in the attainment of entelegyny, and is therefore highly unparsimonious. The Phyxelidinae may be primitive araneocladans unrelated to the Amaurobioidea, but this hypothesis requires parallel development of both retrolateral and dorsal palpal tibial processes and divided cribellum and leaves the sister group of the phyxelidines an unsolved question.

TRACHEAL SYSTEM: Forster (1970) divided the bulk of the cribellate spiders into two superfamilies, Amaurobioidea and Dictynoidea, based on the structure of the tracheal system. His Amaurobioidea included those spiders with the tracheae slender and unbranched and was made up of at least the families Amaurobiidae, Agelenidae, Stiphidiidae, Amphinectidae, Neolanidae, Psechridae, Ctenidae, and Cycloctenidae (Forster and Wilton, 1973). Dictynoidea, by contrast, has at least the median pair of tracheae strongly branched or divided, and comprises the families Dictynidae, Hahniidae, Desidae, Cybaeidae, Argyronetidae, Amaurobioididae, and Anyphaenidae (Forster, 1970). It was not argued which, if either, of these alternative tracheal configurations was relatively apomorphic, and it is beyond the scope of this work to evaluate the polarity of the tracheal characters. Of relevance here is the nature of the tracheal system in the Phyxelidinae. In members of the Vidoleini (*Matundua silvatica*, fig. 3c, and *Vidole capensis*, fig. 3a) and Phyxelidini (*Malaika lon-*

gipes, fig. 3b) the tracheal system consists of a pair of slender, unbranched lateral tubes and a pair of slender median tubes which branch 2–4 times anteriorly in the abdomen. In the Vytfutiini (*Vytfutia bedel*) there are four simple, unbranched tubes (Deeleman-Reinhold, 1986) of the configuration typical of the Amaurobioidea. The weakly branched tracheae (fig. 3a–c) of the Vidoleini and Phyxelidini are quite different from the typical highly branched median tracheae of the Dictynoidea (Forster, 1970: figs. 2–22) and I see no reason to consider these configurations homologous. Therefore, there are no tracheal characters which would exclude the Phyxelidinae from placement in the Amaurobiidae.

In summary, there are three hierarchically nested synapomorphies of relevance to the placement of the Phyxelidinae. The first is the presence of a retrolateral process (fig. 100b, c) on the male palpal tibia, which is a synapomorphy for Lehtinen's Amaurobiides (Gnaphosoidea, Lycosoidea, Amaurobioidea, Sparassoidea, and Pisauroidea) and Zodariides (Eresoidea, Zodarioidea, Salticoidea, and Thomisoidea). Within this group a divided cribellum (fig. 2a) is a synapomorphy for at least the Lycosoidea [those families with grate-shaped tapeta (Homann, 1971) i.e., Psechridae, Acanthoctenidae, and Zoropsidae], Eresoidea, and part of Lehtinen's Amaurobioidea (e.g., Amaurobiidae). The presence of an additional dorsal tibial process (fig. 100b) on the male palp defines a clade within the clade defined by retrolateral palpal tibial processes and a divided cribellum. This combination of nested synapomorphies occurs in the Phyxelidinae and in *Amaurobius* C. L. Koch, and accordingly defines the family-level taxon Amaurobiidae containing the type genus and its nearest relatives, including the Phyxelidinae.

ALTERNATIVE HYPOTHESES OF RELATIONSHIP

MATACHIINAE AND DESINAE: Lehtinen (1967: 322) stated that the Amaurobiidae may be divided into two natural groups characterized by the presence or absence of a secondary conductor. The subfamilies lacking a secondary conductor are the Matachiinae, Desinae, Stiphidiinae, and Phyxelidinae, and in his figure 11 (Lehtinen, 1967: 313) the branching diagram explicitly shows a relationship of the Phyxelidinae to the Matachiinae and Desinae. The reason for this is presumably the absence of a secondary conductor, implying that the only conductor present in these subfamilies is homologous as a primary conductor. The term "secondary conductor" is defined (Lehtinen, 1967: 412) as an "analogous structure" which "acts as the primary support for the distal part of the embolus" when "the primary conductor of the group has lost its function." This statement specifies that secondary conductors are not homologous wherever found, implies that secondary conductors are derived and therefore possessing only a primary conductor is plesiomorphic, and furthermore, offers no objective criteria for determining if, when only a single conductor is present (e.g., as in the Phyxelidinae), it is the primary or secondary conductor. Therefore, to group the Phyxelidinae with the Desinae and Matachiinae purely on the basis of the absence of a secondary conductor is unwarranted, as it is to group these taxa on the basis of what Lehtinen clearly interpreted as a symplesiomorphy. But are there characters which suggest a relationship of the Phyxelidinae with the Desinae and Matachiinae?

In many Matachiinae and Desinae (e.g., *Badumna longinquus* (L. Koch), personal obs.) the only conductor arises near the embolic base on the probasal margin of the tegulum far proximad of the origin of the median apophysis and is intimately associated with the embolus for its entire length. In members of each phyxelidine tribe (i.e., *Vytfutia*, all Vidoleini, and at least *Namaquarachne* in the Phyxelidini) the conductor arises from the retroapical margin of the tegulum distad of the median apophysis and far from the embolic base and this is taken to be the ground plan for the Phyxelidinae. The primitive retroapical origin of the conductor is not readily apparent in those taxa with greatly enlarged conductors, e.g., *Malaika* (fig. 62a) and *Phyxelida* (fig. 82a). The conductor of *Vytfutia* (fig. 100a) is very similar to that found in the Amaurobiinae, and while each is autapomorphically modified, the grooved conductor of the Phyxelidini (fig. 9) and the sclerotized, cuplike conductor of the Vidoleini (fig.

10a, b) are clearly homologous with those structures in the Vytfutiini and the Amaurobiinae by virtue of their identical place of origin on the bulb. Lehtinen confused the EBS (embolic basal sclerite) (fig. 10a, b) of *Vidole*, *Xevioso*, and *Matundua*, and the conductors (C in fig. 9) of *Themacrys*, *Phyxelida*, and *Malaika*, referring to all as "primary conductor" (Lehtinen, 1967: 330), and the true conductors of *Vidole* and *Xevioso* (C in fig. 10a, b) were referred to as the "fulcrum." Thus if position is an adequate indication of homology of the conductors of the phyxelidines and other taxa, this character points to a relationship with the Amaurobiinae rather than with the Desinae and Matachiinae. In addition, most of the genera of Lehtinen's Desinae and Matachiinae were later united into Forster's Desidae (Forster, 1970), a family characterized by highly branched median tracheal trunks very different from the slender, simple to weakly branched median tubes of the Phyxelidinae. The evidence of a sister-group relationship between the Phyxelidinae and the Desinae and Matachiinae is unconvincing.

Pimus (Macrobuninae): Lehtinen (1967: 329–330) noted similarity between *Pimus* Chamberlin and the Phyxelidinae in the presence of enlarged, thornlike setae on the inner surface of the palpal femur, but dismissed it as a case of parallelism, arguing that in *Pimus* the thorns are restricted to the male sex, and are not sinuous but tapering to the tip. In fact, tapering thorns like those in *Pimus* are also found in the Vidoleini (fig. 5b, f), but the sexual dimorphism of the thorns in *Pimus* (they are identical in both sexes in the Phyxelidinae) and the fact that they extend in a single row for nearly half the length of the palpal femur (whereas they are restricted to a small proximal group in the Phyxelidinae—cf. fig. 5c–e) argue against homology in these two groups, and against any sister-group relationship between *Pimus* and the Phyxelidinae.

Titanoecidae: Titanoecidae might appear to be considered most parsimoniously as the sister group of the Phyxelidinae, principally because of a divided cribellum and dorsal process on the male palpal tibia and lack tarsal trichobothria. It is therefore not necessary to postulate reversal in the Phyxelidinae for loss of tarsal trichobothria and retention of a single subapical dorsal trichobothrium on the metatarsi. Lehtinen (1967: 381) noted similarities between his Amaurobiidae and the Titanoecidae, but considered these to be to be the unmodified basic pattern of the Araneomorpha. He considered a possible relationship between the Titanoecidae and Phyxelidinae on the basis of the lack of tarsal trichobothria and strong modification of the anterior legs of males, but rejected this possibility, stating that for all other characters the Phyxelidinae have the unmodified basic pattern of the Amaurobioidea. As I have argued above, the similarity in the absence of tarsal trichobothria must be considered a symplesiomorphy unless contradicted by the weight of other apomorphies. In fact there is no similarity in the modification of the first legs of males of titanoecids and phyxelidines. In the former the male first tibia and metatarsus may be very spinose ventrally, but never have the structural modifications of spurs and apophyses (figs. 7b, 8a) found in the phyxelidines. The sister-group hypothesis for the Phyxelidinae would appear to hinge on the homology of the dorsal tibial process where it occurs in the Phyxelidinae, Amaurobiinae, and Titanoecidae. The morphology of the dorsal tibial process suggests that the homology is between the Phyxelidinae and Amaurobiinae. I have had the opportunity to examine representatives of three titanoecid genera: *Titanoeca* Thorell, *Pandava* Lehtinen, and *Goeldia* Keyserling. In each genus the form of the palpal tibial process is fundamentally the same. It has a broad base encompassing the prolateral and dorsal margins of the tibial apex. The tarsus is narrowly articulated with the tibia retrolaterad of the origin of the tibial process. In *Titanoeca silvicola* Chamberlin and Ivie there is a bifid median piece which is reflexed apically and folds proximoventrally around a low retrodorsal ridge. There is also a prolateral lobe which extends apically ventrad of the prolateral fork of the median piece. The processes of *Pandava* and *Goeldia* are equally complicated, though differing in details. This form of tibial process contrasts markedly with that found in the Amaurobiinae and Phyxelidinae. In the Amaurobiinae and at least some members of each tribe of Phyxelidinae (e.g., *Vytfutia*, *Matundua*, and *Malaika*) the dorsal

process is virtually identical, and is simple, conical, and heavily sclerotized (figs. 18a, b, 61a, b, 100b, c). The tarsus is broadly articulated with the tibia ventrad of the dorsal process. I believe that the major differences in position and fine structure of the dorsal processes between Phyxelidinae and Titanoecidae make homology between these structures less likely than between Phyxelidinae and Amaurobiinae. In addition, a sister-group relationship between Titanoecidae and Phyxelidinae would require an additional step in the evolution of the retrolateral tibial process: either the independent gain of the retrolateral process in *Vytfutia*, or a loss of the retrolateral process in the titanoecids (in addition to the loss of the retrolateral process in Vidoleini plus Phyxelidini). On the other hand, exclusion of the Titanoecidae from the group of araneocladans defined by the presence of a retrolateral male palpal tibial process requires parallelism in the evolution of a divided cribellum. The relationships of the titanoecids to other cribellate spiders deserve further study, but are beyond the scope of this paper. Thus I do not consider a dorsal tibial process as a synapomorphy for the Phyxelidinae plus Titanoecidae even though such a relationship would not require postulation of a gain and subsequent loss of a row of tarsal and two rows of metatarsal trichobothria. I prefer the hypothesis of homology of the dorsal processes in the Amaurobiinae and Phyxelidinae and sister group relationship between these taxa.

DEFINITION OF AMAUROBIIDAE AND MONOPHYLY OF PHYXELIDINAE

I define the Amaurobiidae as those spiders with a divided cribellum (fig. 2a) which have simple, sclerotized retrolateral and dorsal tibial processes (fig. 100b, c) on the male palp. Two rows of metatarsal and a single row of tarsal trichobothria are part of the ground plan for this family, although reversal to the plesiomorphic absence of tarsal trichobothria has occurred in some groups. All the included taxa for which the tracheal system is known have the median tracheae unbranched or very weakly branched (fig. 3a–c). Recently, Wunderlich (1986: 138) proposed the synonymy of the Amaurobiidae with the Agelenidae. The reasoning behind this suggestion is not altogether clear. Based on an unspecified agreement of the male and female genital organs he suggested that the Coelotinae F. O. P.-Cambridge 1893 is a junior synonym of the Amaurobiinae Thorell 1870 (Wunderlich, 1986: 24). Without argument he extends this decision to the placement of the Amaurobiinae as a subfamily of the Agelenidae. A relationship between the Coelotinae and the Amaurobiidae is possible. Many coelotines have simple, sclerotized retrolateral and dorsal tibial processes on the male palp. They are ecribellate and therefore it is not possible to determine if a divided cribellum is in the ground plan of the Coelotinae. The colulus of the coelotines is a broad, entire lobe, quite different from the paired, obtusely triangular colular plates found in the true Agelenidae. There appear to be no characters which unambiguously relate the Coelotinae to the Agelenidae, and, therefore, the potential synonymy of the Coelotinae with the Amaurobiinae has no relevance to the status of the latter taxon with respect to the Agelenidae. I consider Wunderlich's (1986) suggestion that the Coelotinae belong in the Amaurobiidae to be a good possibility, but I reject his synonymy of the Amaurobiidae with the Agelenidae.

It is beyond the scope of this study to provide an exhaustive list of included taxa and of those taxa previously listed as Amaurobiidae but not included within the family as newly defined. But preliminarily Amaurobiidae includes at least *Amaurobius* C. L. Koch, *Ambohima*, new genus, *Auximella* Strand, *Cybaeopsis* Strand, *Callobius* Chamberlin, *Kulalania*, new genus, *Lamaika*, new genus, *Macrobunus* Tullgren [if, as Lehtinen (1967: 251) suggests, this is a senior synonym of *Myropsis* Simon], *Malaika* Lehtinen, *Matundua* Lehtinen, *Myropsis* Simon, *Namaquarachne*, new genus, *Phyxelida* Simon, *Pongolania*, new genus, *Porteria* Simon, *Retiro* Mello-Leitão, *Rubrius* Simon, *Taira* Lehtinen, *Tamagrina* Lehtinen, *Themacrys* Simon, *Vidole* Lehtinen, *Vytfutia* Deeleman-Reinhold, *Walmus* Chamberlin, and *Xevioso* Lehtinen.

As a tentative hypothesis, the Phyxelidinae are considered members of the Amaurobiidae. This hypothesis is weak and is preferred here only because all currently available alternative hypotheses are demonstrably weaker. A better understanding of the relation-

ships of the Phyxelidinae, Amaurobiidae, Amaurobioidea, and Dictynoidea will require examination of a vast number of cribellate and ecribellate taxa, detailed comparison of features, explicit coding of characters, and parsimony analysis of the character data. Such a venture is far beyond the scope of this study, and, due to the formidable number of taxa and difficulty in getting sufficient material for dissection and SEM preparation, will not likely be undertaken in the foreseeable future. For analysis of character polarity and construction of the most parsimonious tree(s) using PAUP, the type species of the type genus of the family, *Amaurobius fenestralis* (Stroem), was chosen as the outgroup for the Phyxelidinae. In addition, a large number of cribellate and ecribellate taxa were also examined (Appendix 1) to insure that polarity hypotheses for characters within the Phyxelidinae accurately reflect the distribution of character states in the Amaurobioidea and Dictynoidea.

In the context of the Amaurobiidae the subfamily Phyxelidinae is defined by at least three synapomorphies: (1) at least some of the basal prolateral setae on the palpal femora of both sexes are enlarged (fig. 4a–f), and in many species the setae are also modified into thorns (figs. 4e, f, 5a–f); (2) the tarsal trichobothria are lost and the metatarsal pattern is reduced to a single subapical dorsal trichobothrium, and (3) the origin of the calamistrum is shifted to the median part of metatarsus IV. An additional synapomorphy may be the modification of the male metatarsus I as a clasping structure, though this is structurally different in the Vidoleini (figs. 7b, 40a–d) and in the Phyxelidini plus Vytfutiini, and the details of the modification are not considered homologous in these two groups. The modification of male metatarsus I in which there is a posterolateral subbasal spur surmounted by a clasping spine (figs. 8a, 101a–c), apparently unique in the Araneomorphae, is considered a strong synapomorphy supporting the placement of the Phyxelidini and Vytfutiini in the Phyxelidinae.

CHARACTER ANALYSIS FOR THE PHYXELIDINAE

The character analysis is presented in two parts. The first is a detailed discussion of the morphology of the Phyxelidinae, a classification of those morphologies into characters enumerated in this section, and a discussion of plesiomorphy or apomorphy of the states. The second part, presented as table 2, consists of a sequential listing of each character by number, reference to figures illustrating the states of each character, and a listing of the character state changes required by the cladogram for 55 taxa and 101 characters (figs. 13, 20, 31, 50, 69, 81). Character data for all taxa are listed in Appendix 2.

CARAPACE: The thoracic fovea in most Phyxelidinae and in other subfamilies of the Amaurobiidae (sensu Lehtinen, 1967) is a narrow, longitudinal slit (fig. 17a, c). In most *Phyxelida* and in *Kulalania* and *Ambohima* the fovea is broad (fig. 80a, c), with the length less than five times the width, diamond-shaped to nearly circular, and shallow to deep (Char. 1). This configuration is apomorphic.

LEGS: Examination of the anterobasal surface of the palpal femora of *Amaurobius fenestralis*, *Stiphidion facetum*, and other taxa (Appendix 1) reveals that there may be a few setae, long or short, but that these are not conspicuously different from other setae near the dorsal and ventral margins of the segment. In the Phyxelidinae the anterobasal setae of the palpal femora are usually modified into "thorns" which are defined as setae which are conspicuously different from other setae located at the same level on the segment. Assuming homology for these modifications, there is an apparent transformation series in this character involving enlargement of setal bases, shortening of setae, and thickening of setae. First, setal bases are enlarged, but the setae inserting within them are slender and unmodified. In *Vytfutia bedel* (fig. 4a) at least the bases of the distal two setae of the anterobasal line are enlarged, and the setae inserting within these are shortened. Greatly enlarged setal bases containing normal, slender setae are found in some *Themacrys* (see especially *silvicola*: fig. 4e, f). Enlargement of setal bases (Char. 2) is considered as a synapomorphy for the Phyxelidinae including *Vytfutia bedel*. Second, setae may be shortened and in all cases this is associated with enlarged bases. This state is found in *Vytfutia bedel*, *Malaika* (fig. 4b), *Lamaika*, many *Phyxelida* (fig. 4d) and *Themacrys* (fig. 4e, f), and *Ambohima*. The combination of short-

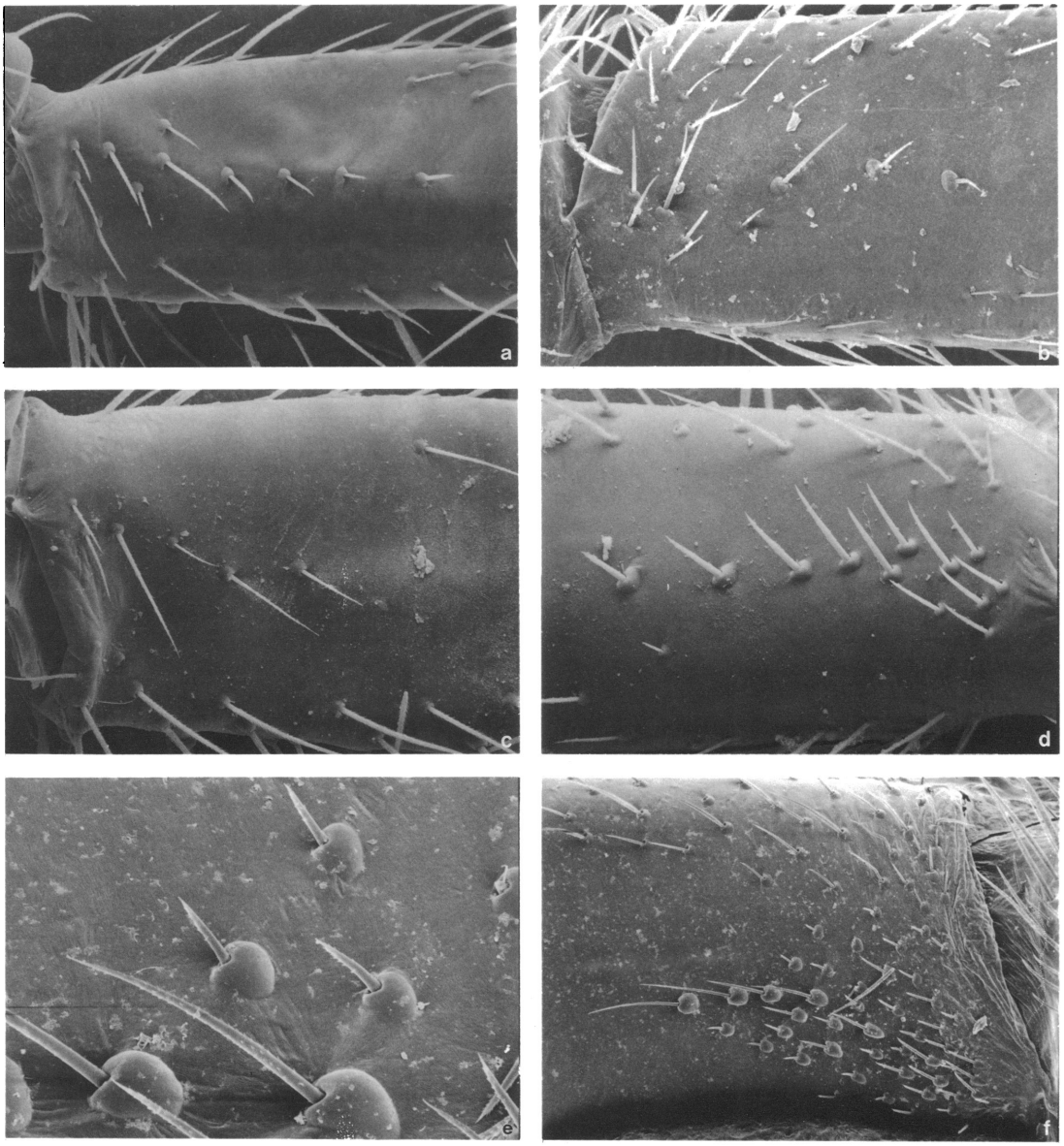

Fig. 4. Phyxelidinae, basal prolateral setae on palpal femur. **a.** *Vytfutia bedel* Deeleman-Reinhold, paratype female. **b.** *Malaika longipes* (Purcell), Skeleton Gorge, female. **c.** *Phyxelida makapanensis* Simon, paralectotype, female. **d.** *Phyxelida fanivelona*, new species, female paratype. **e, f.** *Themacrys silvicola* (Lawrence), male, Town Bush.

ened seta and an enlarged base renders the character distinctly thorn- or picklike. Third, setae are thickened, and usually shortened as well. This varies from slight (only the thick, proximal part of the seta remains) to the greatly enlarged setae characteristic of *Vidole*, *Xevioso* (fig. 5c, d), *Matundua*, *Pongolania*, and *Namaquarachne* (fig. 5a, b) (Char. 3). Enlarged bases, considered plesiomorphic for the Phyxelidinae, are present, but in many cases the enlargement of the bases is rendered inconspicuous by the relative size of the seta. Base enlargement and shortening and thickening of at least distal setae may be variable

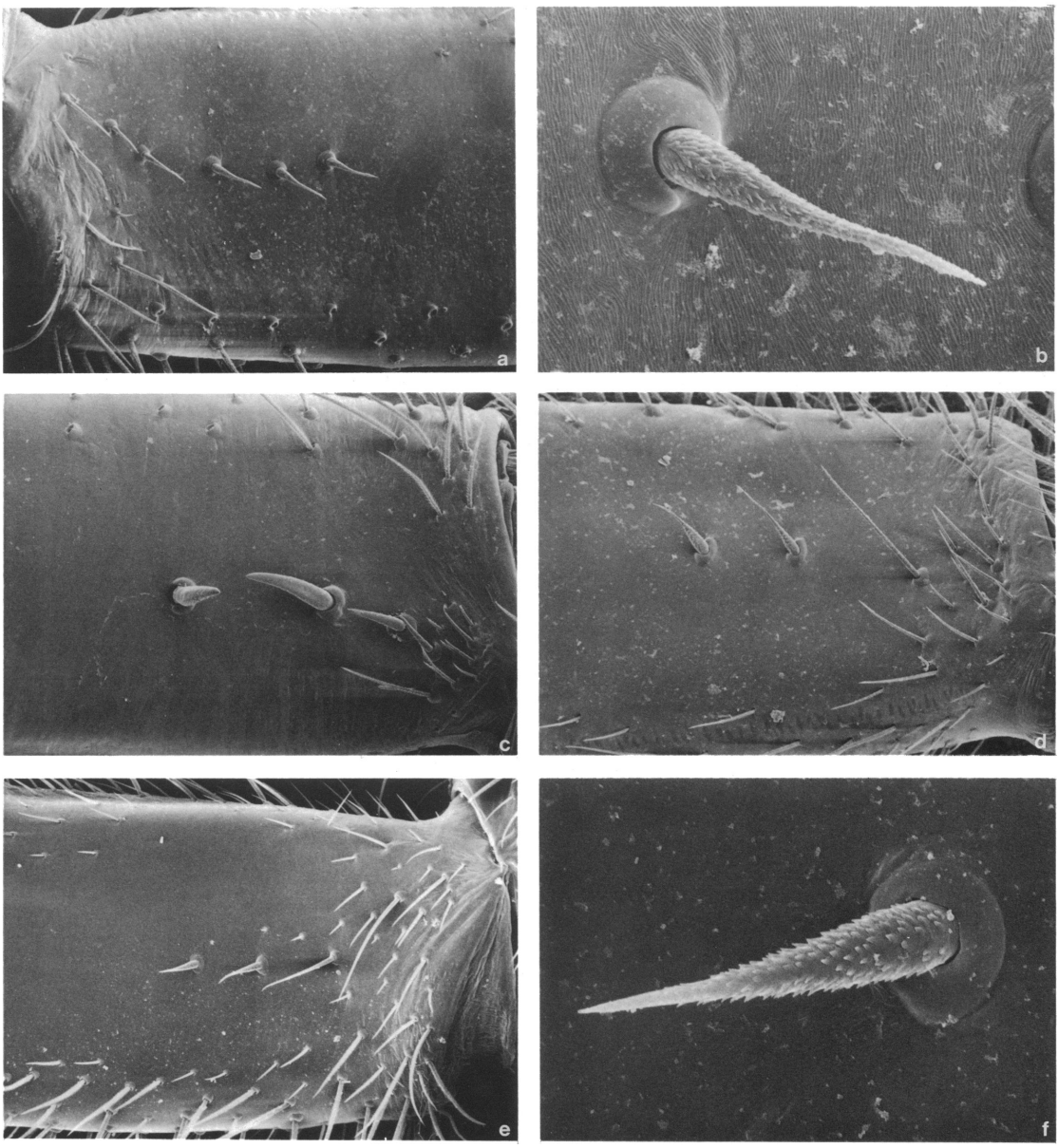

Fig. 5. Phyxelidinae, basal prolateral setae on palpal femur. **a, b.** *Namaquarachne tropata*, new species, Grootvadersbosch, female. **c.** *Xevioso amica*, new species, False Bay, male. **d.** *Xevioso amica*, new species, False Bay, female. **e, f.** *Vidole capensis* (Pocock), female, Buffels Bay.

within taxa (e.g., *Phyxelida*, *Malaika*); in some species (e.g., *Phyxelida makapanensis*) all anterobasal setae of the palpal femur are unmodified (fig. 4c).

As I have discussed previously, other subfamilies of the Amaurobiidae (sensu Lehtinen, 1967) have the plesiomorphic condition of two rows of trichobothria on the metatarsi and a single row of the tarsi. Therefore the reversed condition of the Phyxelidinae in which the metatarsi have only one apical, dorsal trichobothrium (Char. 5) and tarsi are without trichobothria (Char. 4) is apomorphic. The hairs on the legs of most Phyxelidinae

and all Amaurobiinae which I have observed are of the simple, serrate-plumose type. The feathery hairs of *Malaika* (Char. 6) are unique within the Phyxelidinae and therefore considered apomorphic. The apices of metatarsi III and IV (at least in male) of *Vidole*, *Pongolania*, and *Xevioso* (fig. 6e) have pro- and retroapical groups of regular setae which are presumably preening combs (Char. 7). I have not observed similar combs among other Phyxelidinae or Amaurobiinae, but rather the apical setae of the metatarsi are typically irregular. An apical comb occurs on metatarsus IV of *Amaurobius fenestralis*, but this comb is composed of a transverse row of six slender spines which differs from the comb of closely spaced setae found in the Vidoleini and the two combs are presumably not homologous. The calamistrum in the Phyxelidinae is median to subapical with its origin at greater than 0.30 from metatarsus IV base (Char. 8), whereas in all Amaurobiinae it is basal, with the origin at less than 0.25 from metatarsus IV base. Among other subfamilies of the Amaurobiidae (sensu Lehtinen, 1967) a median calamistrum occurs sporadically (e.g., in *Stiphidion facetum*), but this is presumably derived independently.

MOUTHPARTS: The chelicerae and palpal coxae of the Phyxelidinae show a number of sexually dimorphic features found only in males which provide good characters. The male palpal coxae of *Malaika* have a basal dorsolateral triangular projection (Char. 9). Such a modification does not occur in any other Phyxelidinae, all of which have simple, convex palpal coxae, and I have not observed any similar structures in any Amaurobiinae. In the males of many Phyxelidinae lateral setae on the chelicerae are modified into short, stout spinules (fig. 7e, f) arranged in a longitudinal row (Char. 10), whereas only normal, long, slender setae occur in females of the Phyxelidinae. I have not observed such cheliceral spinules in the Amaurobiinae. The sporadic occurrence of these spinules suggests that they are apomorphic wherever found. The chelicerae of Phyxelidinae are usually smooth laterally, but in males and females of many species the chelicerae may be finely wrinkled to rugose. Regular groups of deep striae (Char. 11) are found in males of a few Phyxelidinae and are presumably apomorphic. I have not observed similar striae in any of the Amaurobiinae. Very deep ventral striae (Char. 12) are likewise unique and are a synapomorphy for *Namaquarachne* (fig. 49c).

MALE PALPAL TIBIAL PROCESSES: A group of taxa, traditionally placed in the Amaurobiidae, (e.g., *Amaurobius fenestralis*) have ventral, retrolateral, and dorsal tibial processes. Retrolateral processes are widespread among the traditional "amaurobiids," but dorsal processes are restricted to, and probably represent a synapomorphy for, a small number of genera. I hypothesize that the presence of a dorsal tibial process defines a restricted Amaurobiidae, and that such a process is homologous where found in *Amaurobius fenestralis*, *Vytfutia bedel*, and the Phyxelidinae. Dorsal and retrolateral processes (fig. 100b, c) occur in many amaurobiids (e.g., *Amaurobius fenestralis* and *Vytfutia bedel*); therefore the presence of these processes is considered plesiomorphic. The absence of a retrolateral process (Char. 13) in the Vidoleini and Phyxelidini is apomorphic (figs. 19d, 29c, 61b), and is regarded to be the result of loss.

Assuming the homology of the dorsal process (D) throughout the Phyxelidinae, we may trace various and independent modifications among the genera. Homologies are proposed through examination of the relative position and fine structure (e.g., setose or asetose) of various processes. The phyxelidine palpal tibia includes several homologous sectors:

a) a prolateral condyle (P) at the base of the cymbium which is asetose, and hyaline to strongly sclerotized; this may be undifferentiated, a flange, or a flange which is weakly to strongly produced distally and dorsally (fig. 61a, b);

b) a posterodorsal, setose sector (DA) which may be undifferentiated, a weakly to strongly produced lobe, or acutely produced (DAS) (figs. 41b, 79c);

c) a dorsal, sclerotized process (D), always asetose, which may be conical, cylindrical, blunt, or hyaline (e.g., Df in fig. 29c) and variously modified (figs. 21b, 32b, 49a, b, 79d);

d) often there is a ridge which connects the base of D to R (figs. 58b, 61b);

e) a setose retrodorsal sector (R, R1+2) usually shorter than the DA and not produced, though it may be modified apically (figs. 58b, 67d). Sector R is not homologous

to the retrolateral spur (fig. 100b) on the dorsal process in *Vytfutia bedel*; as in the latter case this is an asetose branch of the process, whereas in the former there is a ridge connecting R with D, and R is at least partly setose. Neither is it homologous to the retrolateral process (RL) of *Vytfutia bedel* (fig. 100b), as in that case the process is asetose and arises just dorsad of the intersegmental membrane, whereas in those phyxelidines with a produced R (e.g., *Themacrys*, fig. 67d) this arises far dorsad from the intersegmental membrane, and is setose to the apex at least in part.

f) a conspicuous retrolateral condyle at the base of the cymbium, unmodified.

Modifications of the palpal tibia provide synapomorphies for several restricted groups within the subfamily. In *Namaquarachne* the DA is not produced, and the R may be weakly (*N. tropata*) to clearly produced (Char. 22) with a sclerotized apical margin (fig. 51b) (*N. thaumatula*, *N. khoikhoiana*). The apex of D is twisted and folded into a sclerotized knob (Char. 20), which is a synapomorphy for the genus (fig. 49a, b). In *N. tropata* D tapers to the apex where there is a small, dorsal directed knob (fig. 55b, c), whereas in *N. thaumatula* and *N. khoikhoiana* D is slender, petiolate (fig. 53a, b), with a large dorsoventral clavate apical process (Char. 21).

In *Malaika*, *Lamaika*, and *Ambohima* D is present and solid, conical to stout. The apex of R may be normal (*Ambohima*, fig. 65b, c), or in *Lamaika* (fig. 58b) and *Malaika* (fig. 61a, b) it is sclerotized and connected to the base of D by a ridge (Char. 15). This is a synapomorphy for the *Lamaika* group, and is presumably lost in *Ambohima*. The process P, which is developed from the prolateral condyle at the cymbial base, is enlarged (greater than is so in *Themacrys* or *Amaurobius fenestralis*), and is developed as a weak to strong dorsad directed process. Enlargement of P and development of a distal process is a synapomorphy for *Malaika*, *Lamaika* (fig. 58b), and *Ambohima* (Char. 16) and differs from the enlarged P in *Amaurobius fenestralis*. A strong dorsad directed process (Char. 17) unites *Malaika* and *Ambohima*, and it is lobate (fig. 61b) in the former and hooklike (fig. 65b) in the latter.

In *Themacrys* the unique R1+2 (figs. 67d, 73b) is always removed far dorsad of the ventral tibia-tarsus intersegmental membrane, and the outer lobe (R2) is setose to the apex. The R1+2 of *Themacrys* is probably homologous to the R ridge of *Malaika*, *Lamaika* and *Ambohima*, and the produced R of *Phyxelida*. All species have a prominent retrolateral cymbial condyle (fig. 73c). The P condyle is prominent, but not produced dorsally as in *Malaika*, *Lamaika*, and *Ambohima*. Division of the R sector into an outer, setose lobe (R2) and an inner, asetose, sclerotized ridge (R1) is a synapomorphy (Char. 14) for *Themacrys*; the modification of R1 into a long, slender process (fig. 73b) is an autapomorphy for *T. monticola*.

In *Phyxelida* (fig. 79c) all species have a central to retrodorsal asetose, sclerotized process (D) which is homologous with D throughout the Phyxelidinae. On the prolateral side of D is a produced setose lobe (DA), probably analogous to the DA of *Vidole* (fig. 19d) and *Xevioso* (fig. 37b) (Char. 18). There may be a retrodorsal lobe in some species (*P. sindanoa*, fig. 88b, *P. kipia*, fig. 86b, *P. abyssinica*, fig. 84b) which is setose and is probably homologous to the R2 of *Themacrys* and the R of *Malaika*, *Lamaika*, and *Ambohima*. The D appears to have been primitively broader, but the edges have now been "rolled in" ventrally (fig. 79d) to form a narrower process with a retrolateral concavity (Char. 19). This condition is unique within the Phyxelidinae and Amaurobiinae. The upper margin of this concavity is the former anterodorsal side of the D and the lower margin of D is now a ridge which runs nearly to the base of the retrolateral cymbial condyle. The "rolled" nature of the D is barely evident in the very narrow D of *P. sindanoa* and *P. carcharata*, though the thicker anterodorsal portion is apparent; these species also lack the connection between the retrolateral ridge and the base of D. Probable synapomorphies for *Phyxelida* are the greatly produced, setose DA lobe (Char. 18) and a D process which is flattened, rolled, or folded, with a retrolateral concavity (Char. 19).

In *Matundua* (fig. 18a, b) D is elongate, sclerotized, and acutely pointed, with two subbasal, retrolaterad-directed teeth; R is rounded, not produced, and DA apex is produced as a sclerotized ridge. The D is probably plesiomorphic, as it is very little different from that in *Vytfutia bedel*.

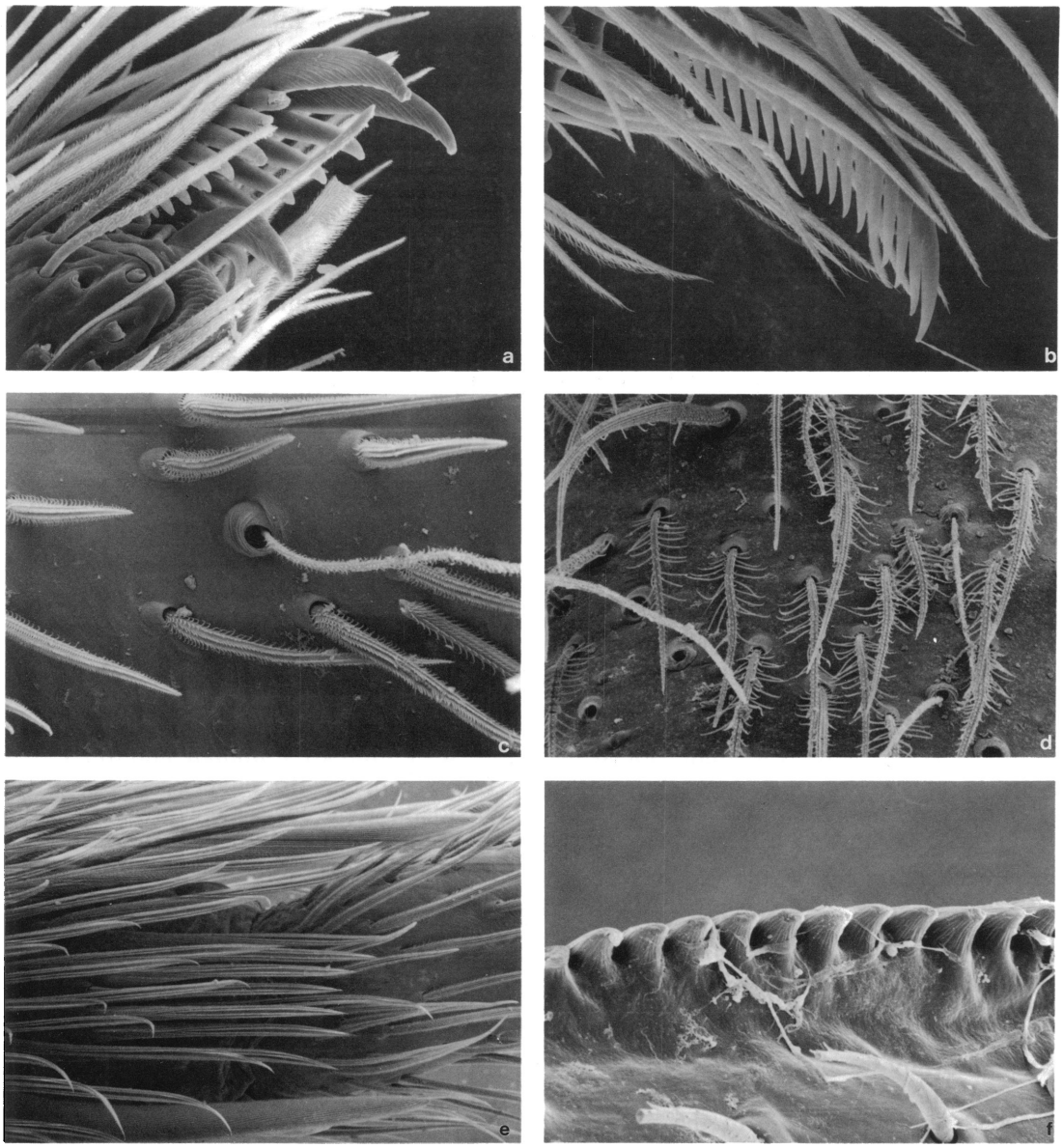

Fig. 6. Phyxelidinae females. **a.** *Xevioso amica*, new species, False Bay, claws IV. **b.** *Phyxelida makapanensis* Simon, paralectotype, palpal claw. **c.** *Xevioso amica*, new species, False Bay, tibia III, ordinary plumose setae and trichobothrial base. **d.** *Malaika longipes* (Purcell), Skeleton Gorge, tibia IV, feathery setae. **e.** *Xevioso amica*, new species, False Bay, prolateral comb at apex of metatarsus III. **f.** *Xevioso amica*, new species, False Bay, cheliceral serrula.

In *Vidole* and *Xevioso* the D is hyaline (Char. 23) and stretches between the normal, weakly produced R and a broad, apically produced DA; both R and DA are setose to the apices (figs. 21b, 32b). In *Vidole* (fig. 19d) the DA always extends distad of the apex of D (Char. 24). The hyaline D is homologous to D in other genera, and is synapomorphic for *Vidole* and *Xevioso*. In *Xevioso* only the D process of *X. zuluana* (fig. 37b) seems to be

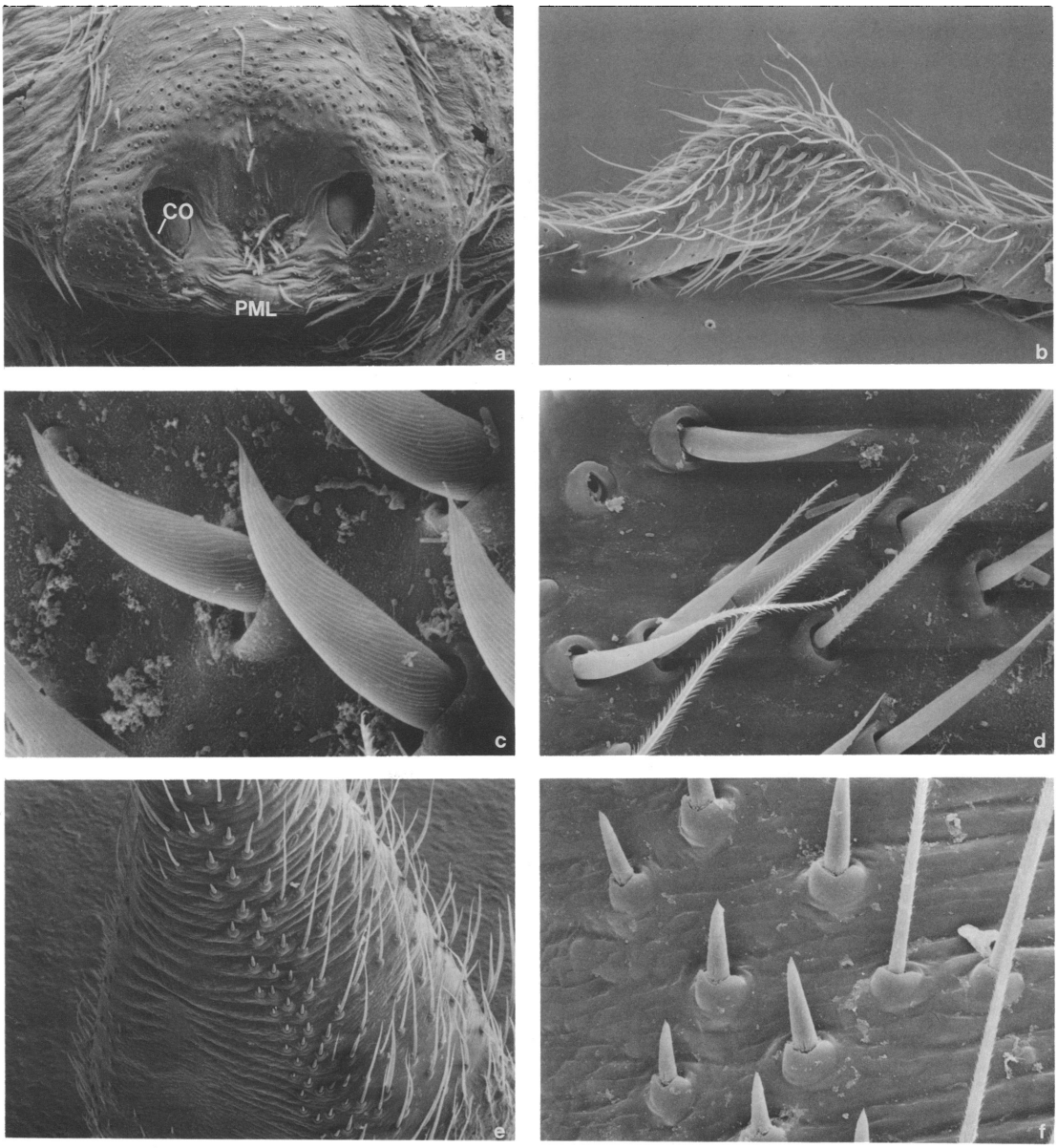

Fig. 7. *Xevioso* spp. a, e, f. *amica*, new species, False Bay. b–d. *lichmadina*, new species, Haenertsburg. **a.** Female epigynum, ventral. **b–d.** male metatarsus I. **e, f.** Lateral spinules on male chelicerae. CO = copulatory opening; PML = posterior median lobe of epigynum.

nonhyaline. In *Xevioso jocquei* the D process is narrow and elongate but its translucent nature indicates that it is hyaline. In *X. jocquei* most of the hyaline D has been lost between the elongate process remaining and the normal, setose DA (fig. 46b). D is stretched between DA and R in most *Xevioso*; a central flange (Df) occurs in *X. orthomeles* (fig. 34b), *X. amica* (fig. 29c), and *X. tuberculata* (fig. 32b) (Char. 26); D is broad to the apex of DA in *X. lichmadina* (fig. 42b) and *X. kulufa* (fig. 45b) and is produced as a broad, retrolateral-directed lobe (Char. 27); D may be reduced (*X. colobata*, fig. 41b) to lost (*X. aululata*, fig.

39b). The DA is a normal, broad, setose lobe, usually ending even with or proximad of the apex of D. In *X. zuluana* DA is elongate, with the prolateral setae enlarged (fig. 37b), whereas in *X. colobata* and *X. aululata* the apex of DA is modified into an elongate, acutely pointed, asetose sclerotized process (Char. 25, figs. 39b, 41b).

MALE LEG I MODIFICATIONS: Among all the amaurobiid subfamilies recognized by Lehtinen (1967), or among the Dictynoid (Forster, 1970) and Amaurobioid (Forster and Wilton, 1973) families of Forster, modifications of leg I are nearly absent. Therefore, where such modifications occur in *Vytfutia* and the other Phyxelidinae these can be considered derived. Four types of modifications may be recognized: (1) Metatarsus I has a retrolateral spur near the base (fig. 8a) surmounted by a stout to slender spine, with a retrolateral concavity distad of the spur and extending to midsegment (Char. 28). This configuration is unique, suggesting that it is homologous and derived wherever found in *Vytfutia*, *Namaquarachne*, *Themacrys*, *Phyxelida*, and *Lamaika*. Typically metatarsus I is straight and cylindrical distad of the concavity but may rarely be sinuate (Char. 31, fig. 97a, c) or have a dorsal carina (Char. 30, fig. 78b, d). The interior of the concavity is typically evenly curved but may have a low, setose mound (Char. 32, fig. 97b, d); (2) A prolateral spur surmounted by a short, stout spine occurs at midsegment on metatarsi I and II of *Ambohima* (fig. 66a–d). Associated with these spurs are short prolateral concavities with fine to stout spinules. There is no evidence that the metatarsi I and II are twisted, bringing a primitively retrolateral spur into the prolateral position, therefore this modification is considered as an independent derivation; (3) Metatarsus I may have a dorsal-prodorsal triangular process (figs. 7b, 33a–d) associated with a distal, lateral kink at midsegment (Char. 34). This modification is unique, occurring only in some *Xevioso*. This process is not homologous with that found in *Vytfutia* or other phyxelidines. Usually associated with a dorsal triangular process are fine spinules clearly derived from setal bases and interspersed with normal setae. The dorsal triangular projection is usually precipitous or overhanging distally (fig. 47a, b) but it may slope distally (Char. 35, fig. 44a–d), and the apex is usually rounded but it may be prolonged and narrowed to a point (Char. 37, figs. 33a, 40a–d). In addition there may be small dorsal lobe (fig. 33a, c) distal to triangular lobe (Char. 36). Spinules usually extend far distad of dorsal process (fig. 40a–d) but may be restricted to vicinity of process (Char. 38, fig. 44a–d); (4) In *Vytfutia bedel* there is a submedian dorsal process at the apex of the retrolateral concavity on metatarsus I (fig. 101a–c). This process is sharply pointed, striate, heavily sclerotized, and asetose. It is therefore not homologous with the dorsal process of *Xevioso*.

Spinules (Char. 33) are frequently found in association with modifications of the metatarsi. Examination of the fine structure of these setae reveals that they are not all homologous as spinules. Some are clearly thickened setae and are interspersed among ordinary setae (fig. 7c, d); others are stouter and occur in pure fields (fig. 8d); finally very stout spinules (fig. 78b, d) are found dorsally on metatarsi I of *Themacrys irrorata* and *T. cavernicola*. A unique subbasal, prodorsal, retrolaterad-directed spear-shaped process with a terminal pore (Char. 29) occurs in two species of *Themacrys* (fig. 8b, c).

MALE PALPAL BULB: Male palpi of *Vidole capensis*, *Xevioso amica* (fig. 10a, b), *Namaquarachne tropata*, *Themacrys silvicola* (fig. 9), and *Malaika longipes* were expanded and examined in detail. In those taxa in which males are rare or unique (*Vytfutia bedel*, *Phyxelida*, *Matundua silvatica*, *Lamaika distincta*, and *Ambohima sublima*) only examination of unexpanded bulbs was possible.

I. CYMBIUM: The Amaurobiinae (*Amaurobius*, *Callobius*, and *Callioplus*) all have cymbia with retrobasal excavations; these may be dorsal or ventral. In *Vytfutia bedel* there is a retrolateral, ventral cymbial excavation (fig. 100a), but it is not clear if this is homologous with those found in the amaurobiines. The Phyxelidinae have no obvious cymbial excavations.

II. BASAL HAEMATODOCHA: The petiole is insignificant (figs. 9, 10a, b, BH), and is very weakly sclerotized or absent (*Namaquarachne*, *Themacrys*).

III. SUBTEGULUM: Subtegulum has 4–5 lightly sclerotized anelli (figs. 9, 10a, AN)

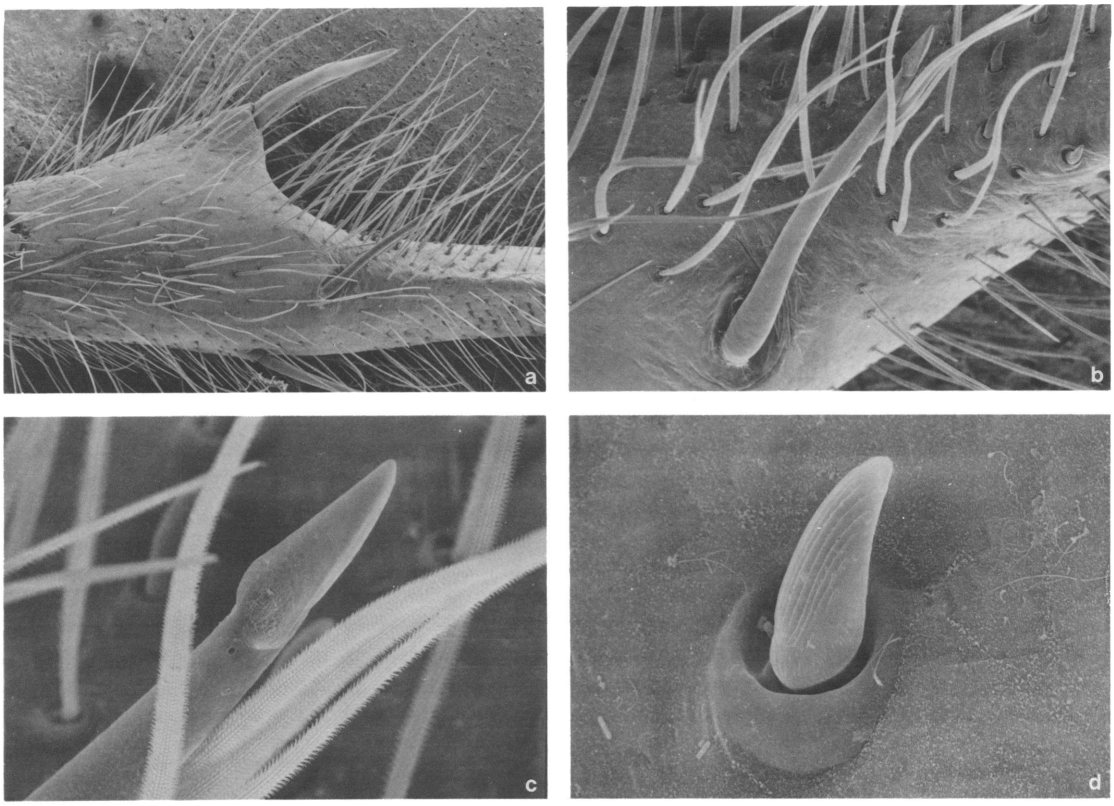

Fig. 8. *Themacrys silvicola* (Lawrence), Town Bush, male metatarsus I. **a.** Retrolateral spur and clasping spine, dorsal. **b.** Spear-shaped seta. **c.** Apex of spear-shaped seta. **d.** Cuspule.

(these not apparent in *Namaquarachne tropata*). The subtegulum is a typical sclerotized ring (fig. 10b), with the fundus of the receptaculum seminis extending into the subtegulum. The subtegulum may be visible marginally, especially along the prolateral margin of the unexpanded bulb, or completely hidden.

IV. MEDIAN HAEMATODOCHA: This is a flexible, nonexpandable connection between the subtegulum and tegulum, occurring in all species (figs. 9, 10a, b, MH).

V. TEGULUM: The tegulum (T) of the phyxelidines is largely or wholly sclerotized, and contains the reservoir which represents the greater part of the receptaculum seminis. It is typically broadly convex and oval or triangular, but may be swollen and hemispherical (Char. 50, figs. 48a, 51c). Several homologous structures on the tegulum may be identified: (a) The embolus (E) is a sclerotized process containing the ejaculatory duct (figs. 9, 10a, b). It is usually cylindrical and spinelike, but may be flattened (Char. 60). In *Vytfutia* (fig. 100a) it is long and ribbonlike and in *Matundua* (fig. 18c) and *Phyxelida bifoveata* (fig. 96a) it is short and bladelike. A similar bladelike embolus occurs in *Amaurobius fenestralis*. (b) The conductor (C) is a process arising from the apex of the tegulum and is usually associated with the tip of the embolus (figs. 9, 10a, b). In all cases this is separated from the embolic base by a region of flexible, unsclerotized cuticle. The position (tegular apex) suggests that the conductor is homologous in all Amaurobiinae and Phyxelidinae. (c) The median apophysis (MA) in the Amaurobioidea is typically a sclerotized process arising from a flexible, socketed connection proximally to retrolaterally (Char. 40) on the tegulum. In the majority of the Amaurobiidae (as herein defined) the median apophysis is heavily sclerotized and platelike (Char. 43), but it is largely unsclerotized in

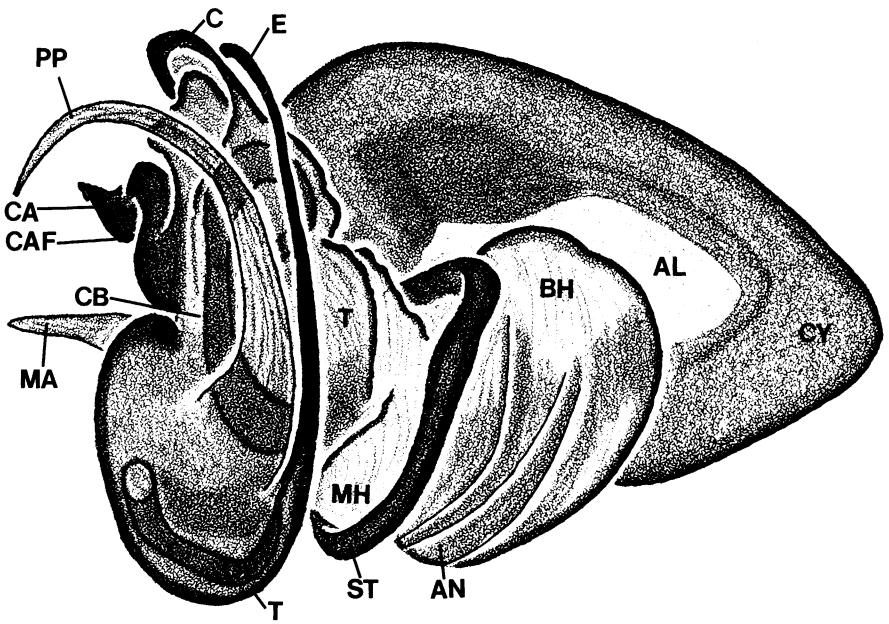

Fig. 9. Left male palpus of *Themacrys silvicola* (Lawrence), Town Bush, expanded, prolateral. AL = alveolus; AN = anelli of basal haematodocha; BH = basal haematodocha; C = conductor; CA = conductor apex; CAF = subapical rounded flange; CB = flexible base of conductor; CY = cymbium; E = embolus; MA = median apophysis; MH = median haematodocha; PP = lamellate pars pendula; ST = subtegulum; T = tegulum.

the phyxelidines (Char. 39). In *Vytfutia bedel* (fig. 100a, c) the median apophysis is elongate and unsclerotized except for the apical portion, which is associated with the tip of the embolus and may function as an accessory conductor. It arises from a retrobasal socket on the tegulum. In other phyxelidines typical median apophyses arising from cuticular sockets occur only in *Malaika* (fig. 62a), *Lamaika* (fig. 58a), and *Phyxelida* (fig. 82c). They are completely unsclerotized in these genera. In *Malaika* and *Lamaika* the socket is retrobasal, and the median apophysis is short, clavate, with an apical hook (Char. 41, figs. 58a, 60d), and is directed retrolaterad (Char. 42, figs. 58a, 60b). In *Phyxelida* the socket is usually retroapical, and the median apophysis is cylindrical, usually elongate (fig. 82a), and may be directed distad (fig. 88a) or proximad (Char. 42). These are clearly homologous to the median apophyses of *Amaurobius* and *Vytfutia*. Because of similarity in position to the median apophyses of *Phyxelida*, the short, flattened, triangular retroapical processes of *Themacrys* (figs. 67a, b, 73a) and *Namaquarachne tropata* (figs. 48e, 55a, c) are considered to be homologous to, and reductions of, the median apophysis. No apparent homologs of the median apophysis are found in *Vidole* (fig. 19c), *Xevioso* (fig. 10a, b), or *Matundua* (fig. 18a, c: the median apophysis is presumably lost (Char. 45), all tegular processes occurring in these genera appear to be unique to them.

VI. SPECIAL MODIFICATIONS OF THE TEGULUM—PARS PENDULA-LAMELLA: Associated with the origin of the embolus is an attached area of white, unsclerotized tissue, representing the pars pendula (PP) of the embolus. This is clearly visible at the embolic base in *Vytfutia* (fig. 100a), *Vidole*, and *Xevioso* (fig. 32a). I have not found the PP in *Matundua* because the base of the highly modified embolus is hidden beneath the median sclerite (fig. 18c, MS) and I did not expand the palpus of the unique male. In *Xevioso lichmadina* and *X. kulufa* the PP extends nearly to the embolic tip (Char. 62, figs. 42c, 45a). In the other genera there is no small pars pendula attached to the embolic base,

but instead there is an elongate, flexible, unsclerotized lamella which arises at or just distad of the embolic base and lies close to the embolus for much of its length (Char. 46, PP in figs. 9, 60e). This lamella may be free or loosely attached to the embolus, and always comes free from the embolus in bulbs expanded through treatment in KOH. I believe that this lamella is homologous to the pars pendula, and occurs in *Namaquarachne*, *Themacrys*, *Phyxelida*, *Malaika*, *Lamaika*, and *Ambohima*. In *Ambohima* the lamella is lightly sclerotized and fused to the grooved conductor for much of its length.

VII. CONDUCTOR: In the Amaurobiinae, *Vytfutia bedel* (fig. 100a) and many other phyxelidines, the conductor (C) is associated only with the apex of the embolus, and is concave near the embolic tip. It is soft or with restricted areas of sclerotization, and is smaller than the tegulum. In several phyxelidine genera the conductor is enlarged and has a groove (figs. 9, 48d, 67a) in which the embolus sits for most on its length (Char. 47). This is associated with the presence of an elongate associated lamella (Char. 46) as well. The grooved conductor may be associated with the course of the embolus only (*Namaquarachne*, figs. 48a, b, d, 51a), or it may be modified into a broad, apical lobe (*Themacrys*, fig. 67a, *Phyxelida*, fig. 79b, *Malaika*, fig. 60a–c, e, *Lamaika*, fig. 58a, and *Ambohima*, fig. 65a) which is at least as large as the tegulum with the embolic groove running along the outer margin (Char. 48). The outer, dorsal rim is sclerotized, whereas the body of the conductor and inner, ventral rim are unsclerotized. In *Malaika* (fig. 62a) and *Ambohima* (fig. 65a) the conductor is greatly hypertrophied, twice as large as tegulum (Char. 54). The apex of the lobate conductor is always sclerotized and usually produced (CA) and tapering to a point which is usually directed retrolaterad. Several modifications of the conductor apex (CA) occur: (a) it is twisted proximad and ends medially in *Namaquarachne thaumatula* (fig. 51a) and *N. khoikhoiana* (fig. 53a) and in *Ambohima* (fig. 65a) (Char. 49); (b) it is very slender, elongate, acutely pointed and serrate (Char. 53) in *Phyxelida sindanoa* (fig. 88a) and *P. carcharata* (fig. 89a); (c) it is an elongate, proximad-directed strap in *Lamaika* (fig. 58c); (d) the CA is a discrete, sclerotized, basally wrinkled lobe with a sharply pointed apex (Char. 52, fig. 60d) in *Malaika*; and (e) in all *Themacrys* the CA has an outer, subapical, rounded flange (CAF) on the lower (retrolateral) side (Char. 51, figs. 9, 67a). Lehtinen (1967, table 16) correctly identified the conductor in *Malaika*, *Themacrys*, and *Phyxelida*, and referred to this structure as the "primary conductor." He also noted a "primary conductor" in *Matundua*, but the male upon which these observations were based belongs not to *Matundua* but to the new genus *Namaquarachne*.

In *Xevioso*, *Vidole*, and *Matundua* the conductor is specially modified as an enlarged, fully sclerotized, cup-shaped structure (Char. 55, figs. 10a, b, 29b, d). It arises in an identical position to that of the conductors of the Amaurobiinae and *Vytfutia*, but differs from the conductors of the those taxa in being fully sclerotized and having a broad, mesal concavity and a dorsal-retrolateral transverse ridge (CTR) or shelf. The conductor of *Walmus* (=*Amaurobius*) *latescens* (Chamberlin) resembles this most closely, but differs in being less sclerotized and in having a longitudinal groove to receive the embolic apex as in other amaurobiines. This configuration of the conductor is a synapomorphy for *Xevioso*, *Vidole*, and *Matundua*. Lehtinen (1967, table 16) referred to this structure in *Xevioso* and *Vidole*, as the "fulcrum," but this cannot be homologous with the fulcrum of other taxa (e.g., Pisauridae). Comstock (1912: 119) defined the fulcrum as a modification of the terminal division of the bulb, whereas the structure which Lehtinen called the "fulcrum" arises from the middle division of the bulb. Lehtinen did not mention a fulcrum for *Matundua*, as the male which he attributed to this genus belongs to the new genus *Namaquarachne*. The cup-shaped conductor in *Xevioso* and *Vidole* is thin-walled and usually has an apical, hyaline fringe with a fimbriate margin (Char. 56, figs. 25c, 29d) which is usually infolded and hides the embolic tip. Near the connection of the cup-shaped conductor to the tegulum there is a basal, transverse sclerotized ridge (CL) in *Vidole* and *Xevioso* (Char. 57, figs. 10a, b, 29b). The CL in *Xevioso orthomeles*, *X. amica*, *X. tuberculata*, and *X. zuluana* has a distal mound (Char.

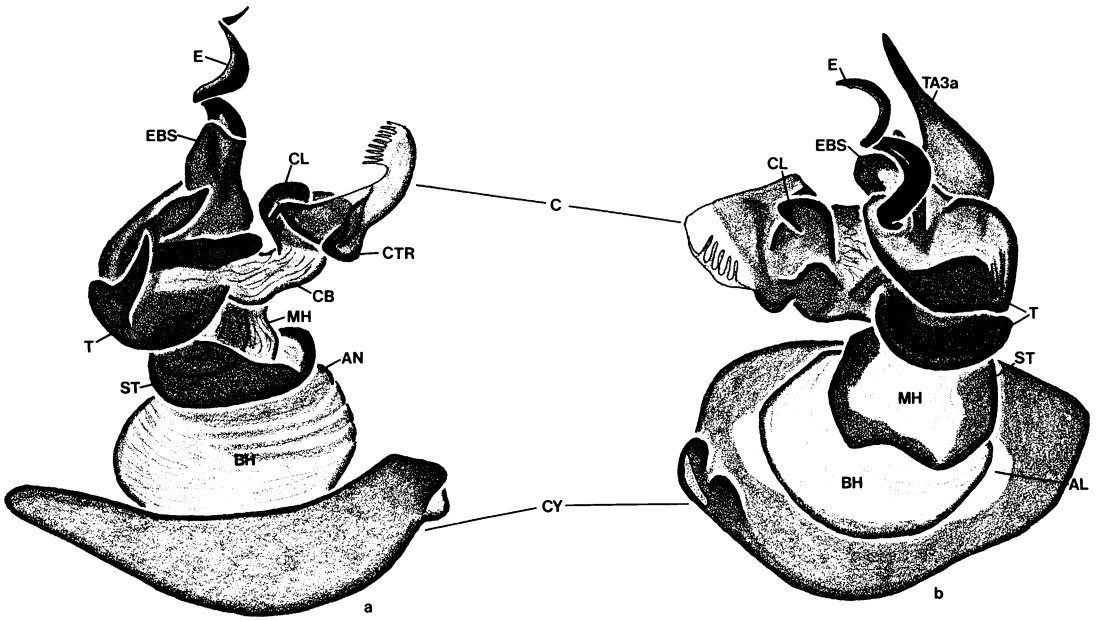

Fig. 10. Expanded palpus of *Xevioso amica*, new species, False Bay. **a.** Retrolateral. **b.** Prolateral. AN = anelli of basal haematodocha; AL = alveolus; BH = basal haematodocha; E = embolus; EBS = basal embolic sclerite; C = conductor; CY = cymbium; CB = flexible base of conductor; CTR = transverse retrolateral ridge of conductor; CL = basal transverse lobe of conductor; MH = median haematodocha; ST = subtegulum; T = tegulum; TA3a = tegular process.

58, figs. 32a, 34a), and in *X. zuluana* (fig. 37a) this mound has a mesad-directed hook. The cup-shaped conductor of *Matundua* (fig. 18a, c) differs in being thick and opaque and in lacking the basal transverse (CL) ridge.

VIII. EMBOLUS: The embolus in *Vytfutia* and most other phyxelidines is elongate, but a short, stout embolus (figs. 39a, 41a) occurs in some *Xevioso* (Char. 61). In most phyxelidines it is slender, cylindrical (Char. 60), and spinelike, and is gently curved. The spiral, screwlike embolus of *Xevioso* (fig. 29b) is unique, and represents a synapomorphy (Char. 59) for the nine species in that genus. I have not observed such a spiral embolus in any other of the Amaurobiidae. The embolus of *Vytfutia* is flattened and ribbonlike, and an autapomorphy for that genus, and the short, broadly flattened emboli of *Matundua* and *Phyxelida bifoveata* are autapomorphies for each. The embolic origin (Char. 63) may be proapical (*Amaurobius fenestralis* and several Phyxelidinae, figs. 18c, 32a), basal (fig. 23a), or retrolateral (fig. 100a).

Sclerotized tegular processes associated with the base of the embolus are unknown in the Amaurobiinae or in *Vytfutia*, and in these taxa the tegulum in the vicinity of the embolic base exhibits normal sclerotization. In some Macrobuninae, e.g., *Pimus pitus*, there is a broad, sclerotized plate associated with the embolic base, called the primary conductor by Lehtinen (1967). In most phyxelidines, the tegulum in the vicinity of the embolic base exhibits normal sclerotization. There is a small swelling or protuberance (PTP) at embolic base (figs. 79a, 84a) in some species of *Phyxelida* (Char. 64). In *Xevioso*, *Vidole*, and *Matundua* the prolateral margin of the tegulum is a rectangular band of heavy sclerotization (figs. 10a, b, 29a, b) which is produced as a process (EBS) distad of the embolic base. Lehtinen (1967, table 16) referred to this structure as the "primary conductor" of *Vidole* and *Xevioso*, but it is clearly not homologous to the true conductor. The presence of the EBS sclerite is a synapomorphy (Char. 65) for *Xevioso*, *Vidole*, and *Matundua*. The EBS is usually divided in various ways, and it is apparent that a divided EBS

is plesiomorphic. The EBS may be directed medially (Char. 66), exposing the embolic base laterad of it (*Vidole*, figs. 21a, 23a), or it may be produced laterally, exposing the embolic base mesally of it (*Xevioso*, figs. 29a, b, 32a, and *Matundua*, fig. 18c). In *Vidole* (figs. 19b, 23a) the EBS is completely sclerotized, extends mesad of the embolic base, and is forked with a distal EBA and a mesal EBM (Char. 67). The median portion of the embolus runs behind and is hidden by the EBS. In *Xevioso* the EBS may be divided (figs. 27a, 39a, 42a, 46a) into two or three apical parts (lateral EBA1, mesal EBA2, and median EBA3), all connected basally, or it may be a simple (figs. 29e, 32a) half cylinder (Char. 68). In *Matundua* (fig. 18a, c) the EBS extends laterad of the embolic base, and the EBS apex appears to have two sclerotized divisions. The distal division (EBA1) is derived from the apex of EBS, but the proximal division (EBA2) arises from unsclerotized cuticle, and therefore the homology of this process with the EBA2 of *Xevioso* is dubious. A large, platelike median sclerite (MS) also arises from soft cuticle. This sclerite is unique to *Matundua*. The embolus arises beneath the median sclerite.

IX. TEGULAR MODIFICATIONS: Several tegular processes occur in the Phyxelidinae, but the homology of these processes across the subfamily is not clear. Clues to the homology of various tegular processes come from: (a) their origin from various sclerotized or unsclerotized sectors on the tegulum; (b) position of their origin relative to the course of the reservoir; (c) position of their origin relative to the origins of the embolus and conductor; and (d) the fine structure of the processes. The tegulum in *Vytfutia*, *Themacrys*, *Phyxelida*, *Namaquarachne*, *Malaika*, *Lamaika*, and *Ambohima* is fully sclerotized ventrally and laterally except for the inner margin of the embolic base (pars pendula, lamella), the conductor, and the cuticle surrounding the origin of the median apophysis. The tegulum in *Xevioso*, *Vidole*, and *Matundua* is divided (fig. 41a) into a series of four longitudinal sclerotized and unsclerotized sectors (Char. 69): (1) prolateral, sclerotized sector associated with the embolic origin and produced into the EBS; (2) median unsclerotized sector extending to the embolic base and pars pendula, and probably homologous with the small unsclerotized region at the embolic base in *Vytfutia* and other phyxelidines; (3) median sclerotized sector from which several processes arise; and (4) retrolateral cuticle of the tegulum when viewed in the unexpanded state which is lightly sclerotized. The cup-shaped conductor arises from the apex of this sector, the origin hidden in the unexpanded bulb behind the sclerotized processes (see below) of the median sector 3.

In *Vytfutia* (fig. 100a), *Themacrys* (fig. 70a), *Phyxelida* (fig. 82a), *Namaquarachne* (fig. 55a), *Malaika* (fig. 62a), and *Lamaika* (fig. 58a) the origin of the conductor is mesad of the origin of the median apophysis, and no processes arise mesad of the conductor origin. In *Xevioso* (fig. 32a), *Vidole* (fig. 25a), and *Matundua* (fig. 18c) the origin of the cup-shaped conductor (C) is behind and dorsad of (anatomically retrolaterad of) the series of processes which arise from the median sclerotized sector 3. All of these processes are solid, usually sclerotized, and arise from sclerotized tegulum rather than from sockets or desclerotized areas. Because of their positions of origin (mesad of the origin of the conductor) and structure (produced from sclerotized cuticle) it appears that none of the tegular processes (TA1, TA2, and TA4) occurring in *Xevioso*, *Vidole*, and *Matundua* are homologous to the median apophysis. Additional unique processes which arise proximad of the origin of the conductor at the edge of tegular sector 4 are TA3 (fig. 19c) of *Vidole*, and TA3a (fig. 29a) in *Xevioso* and *Matundua*, and TA5 arising from median tegular sector 3 of *Matundua* (fig. 18a).

Tegular processes in the Vidoleini offer several characters. The TA1 process is usually small, acutely pointed, and basomedian in position, arising from sector 2 near the margin of desclerotized sector 3 (Char. 71). In *Vidole* it is always sclerotized (figs. 19c, 27a), but in *Xevioso* it may be sclerotized (fig. 29e) or soft and flexible (fig. 39a). The sporadic occurrence of this sclerite in each genus suggests that it has arisen in parallel in *Vidole* and *Xevioso*. The TA2 process of *Vidole* (fig. 19c) and *Xevioso* (fig. 29e) is usually a broad lobe with rounded apex which always arises retrodistad of TA1 and near the margin of sector 4, and at the distal margin of the te-

gulum (Char. 72). The TA3 process of *Vidole* (fig. 19c) is weakly sclerotized and is produced from the mesal margin of sector 4 (Char. 73); it is a weak to pronounced, distad-directed lobe; the reservoir makes a sharp turn toward the interior of the bulb at the base of TA3 between TA2 and TA3. The TA3a (figs. 10a, b, 18c, 29a) process is a pronounced, usually conical, ventrad-directed lobe originating from the unsclerotized cuticle of sector 4 (Char. 74) which causes the basal margin of the tegulum to appear bilobed. The apex of TA3a is usually heavily sclerotized. That TA3a arises proximad of TA3 is apparent because of the sharp, inward turn of the reservoir which occurs at or distad of the base of TA3a; any retrobasal, sclerotized region proximad of the reservoir is considered homologous to TA3a; a conical TA3a process is considered derived in parallel in *Matundua* (fig. 18a) and most *Xevioso*. In *Matundua* TA3a arises from desclerotized cuticle proximad of the conductor origin; the reservoir is not visible through the opaque cuticle of this region, but it does not run laterad of TA3a. The TA4 (fig. 29e) process is a heavily sclerotized, low ridge along the distal margin of the tegulum extending between TA2 and the embolic base (Char. 70) in *Vidole* and *Xevioso*. The TA5 process is unique to *Matundua* (fig. 18a, c). The median sclerotized sector 3 of *Matundua* is reduced in size to a small, proximal band which gives rise to the basal, proximad-directed TA5 process.

X. SPERMATHECAE: I use the term spermathecae to refer to the entire sclerotized internal genitalia of females exclusive of the bursae and fertilization ducts. The receptaculum as here defined is a chamber associated with a poreplate: these pores may be visible as passages through the spermathecal wall, as protrusions, or as filaments extending from the spermathecal lobe. The receptaculum is clearly identifiable in *Themacrys* (fig. 11d), *Phyxelida* (fig. 91a–h), *Namaquarachne* (fig. 12f, g), and *Vidole* (fig. 12b). In *Xevioso* the receptaculum is identifiable only in *X. aululata* (fig. 12d), which retains a bichambered, nonspiral spermathecal configuration, and the receptaculum may be lost in all those *Xevioso* species which have spiral spermathecae. The receptacula of both *Amaurobius* and *Vytfutia* (fig. 100e) are simple, single chambered, and oval to round. Copulatory ducts are either undifferentiated (*Amaurobius fenestralis*) or elongate and transverse (*Vytfutia*, fig. 100e). Bipartite receptacula (i.e., with afferent and efferent chambers in the same capsule), spirals, convolutions, and other modifications of the receptacula are derived. Capsulate spermathecae having bipartite receptacula with a mesal, afferent chamber, and a lateral, efferent chamber are characteristic of the genera *Themacrys* (fig. 11d) and *Phyxelida* (fig. 91a–d), and presumably represent a synapomorphy (Char. 80) for these genera. The same arrangement occurs in the unplaced incertae sedis species from Grootvadersbosch (fig. 93f). The simplest, and presumably most plesiomorphic form, involves oval to spherical median and lateral chambers. This is characteristic of all *Themacrys* (fig. 11d) and *Phyxelida anatolica*, *P. mirabilis* (fig. 91c), *P. makapanensis* (fig. 91a), *P. sindanoa*, *P. carcharata*, and *P. pingoana* (fig. 91b). The spermathecal capsules are narrowed anteriorly in *Themacrys silvicola* (fig. 72c) and *T. ukhahlamba* (fig. 72d) and in *Phyxelida carcharata* (fig. 89e) (Char. 81). In *Phyxelida malagasyana* both chambers are simple, but the mesal afferent chamber is elongate (fig. 91d). A modification (Char. 82) of this configuration involves extension of the efferent chamber anteriorly as a lobe (e.g., *P. apwania*, fig. 91g, *P. tanganensis*, and *P. bifoveata*. In *Phyxelida fanivelona* (fig. 91h), *P. tanganensis* (fig. 91f), and *P. bifoveata* (fig. 91e) an additional, posterodorsal chamber is located on the efferent chamber (Char. 83). The anterior margin of the spermathecal capsule is bilobed (Char. 87) in *P. fanivelona*, *P. jabalina* (fig. 92d), *P. apwania*, *P. tanganensis*, and *P. bifoveata*. The lateral, efferent chamber is convoluted (Char. 84) in *Phyxelida fanivelova* (fig. 91h), *P. jabalina* (fig. 93a), *P. umlima* (fig. 93b), *P. nebulosa* (fig. 93e), *P. irwini* (fig. 93d), *P. crassibursa* (fig. 93c), and *P. eurygyna*. The bursa copulatrix is elongate and extends anterodorsally (Char. 86) to join the receptaculum anteriorly or anteroventrally (fig. 93b–e) in *P. umlima*, *P. nebulosa*, *P. irwini*, *P. crassibursa*, and *P. eurygyna*.

In both *Vidole* and *Matundua* there are sclerotized, hollow, blind-ending ducts com-

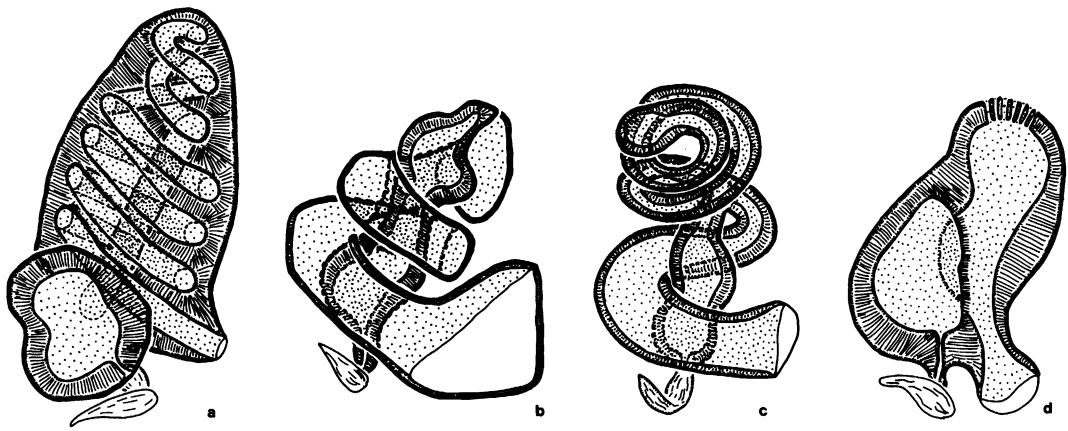

Fig. 11. Left spermathecae of Phyxelidinae, cleared, dorsal views. **a.** *Malaika delicatula*, new species, paratype. **b.** *Kulalania antiqua*, new species, paratype. **c.** *Ambohima pauliani*, new species, holotype. **d.** *Themacrys silvicola* (Lawrence), Town Bush.

municating with the copulatory chambers (Char. 75). In *Vidole* (figs. 12b, 24c) the copulatory chamber communicates with an anterior-directed, tubular cavity (ASD) which ends blindly and empties posterodorsally into simple or complex receptacula. The ASD are usually within stout, sclerotized bars which may serve to strengthen the epigynum from within. In *Vidole capensis* (fig. 26e) and *V. schreineri* (fig. 26f) the ASD has a subapical, lateral diverticulum (Char. 76). In *Matundua* (fig. 12a) the sclerotized, hollow bar extends laterally from the copulatory chamber, and is presumably not homologous to the ASD in *Vidole*.

The internal ducts of the spermathecae of many species of the Phyxelidinae are modified as spirals. All spirals are presumably not homologous, as there is more than one fundamental type. When the left spermathecae is viewed apically, the spiral may be seen to be clockwise (*Malaika*, *Kulalania*) or counterclockwise (*Xevioso*, *Ambohima*, *Vidole*) (Char. 88). The point from which the efferent duct leaves the spiral may also vary. In *Malaika* (fig. 11a) the spermathecal duct spirals anteriad externally, and reverses at the apex into a straight, internal, efferent duct which leads to a posterior chamber (Char. 89.2). In *Kulalania* (fig. 11b) the clockwise spiral extends to the apex and leads to a straight, inner efferent tube. In *Ambohima* (fig. 11c) the spiral begins with the mesal copulatory openings, makes one full turn, and then forks: one fork extends posteriad to the posterior chamber and fertilization duct, the other fork extends anteriad as a blind-ending, counterclockwise spiral of two (fig. 64e) to eight (fig. 64d) turns (Char. 89.0). In *Vidole helicigyna* (fig. 26d) the spiral extends anteriad of the copulatory opening and ends blindly; the ASD branches off the base of the spiral and extends anteriorly beneath (ventrad of) the spiral. In *Xevioso* a variety of spirals are found. In *X. aululata* (fig. 12d) the spermathecae have a lateral, afferent chamber (this appears to be the receptaculum, as evidenced by the anterior pores in the spermathecal wall) and a mesal, efferent chamber. The basal duct of the mesal efferent chamber has a twist of about ½ turn. In all other *Xevioso* species there is a counterclockwise spiral of 4–8 turns. The efferent duct extends posteriad as a straight, internal chamber, and may branch from the second turn from the base (*X. amica*, fig. 12e, *X. orthomeles*), the penultimate turn (*X. zuluana*, *X. tuberculata*), or from the distal turn (*X. lichmadina*, *X. kulufa*) (Char. 90). The distal turn (fig. 43c, d) may be expanded into a large, spherical bulb (*X. lichmadina*, *X. kulufa*) (Char. 91). There is a slender, coiled rod of unknown function (SSG) encircling the outside of the spiraled bursa copulatrix (fig. 35d–f) in all *Xevioso* species with spiraled spermathecae (Char. 92). The fertilization duct of most *Xevioso* species passes within PML is not visible, even in vestigial form. A PML, usually distinct but rarely fused to the

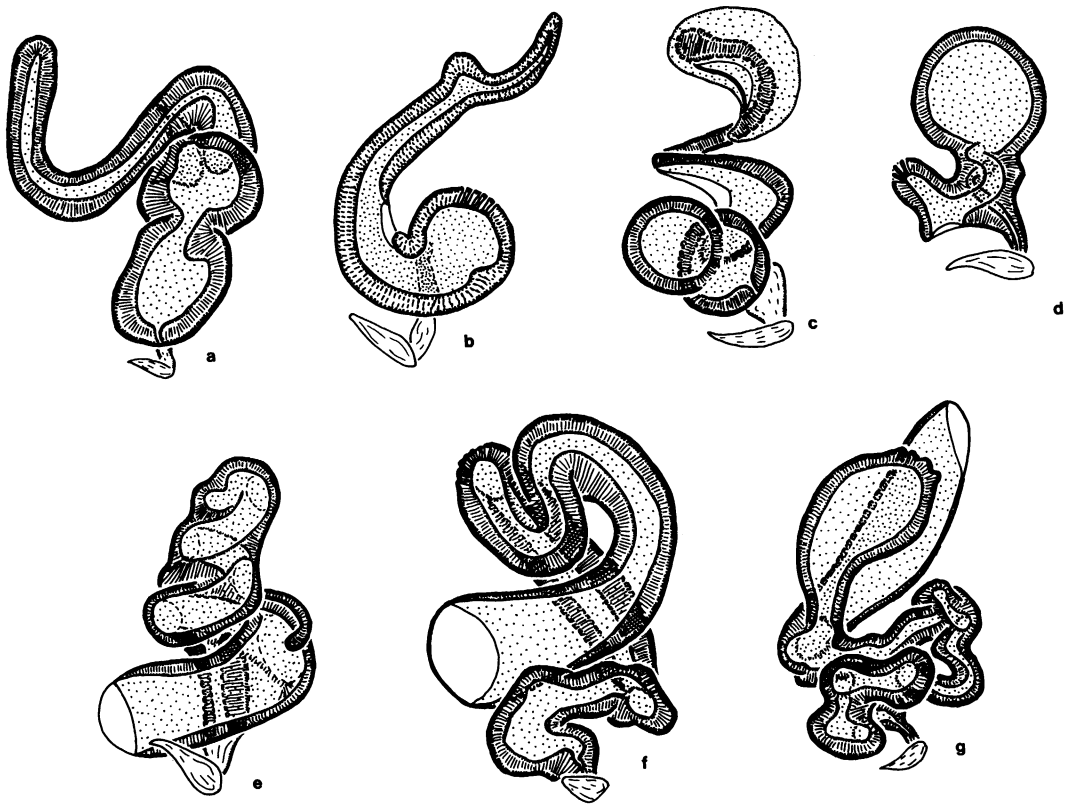

Fig. 12. Left spermathecae of Phyxelidinae, cleared, dorsal views. **a.** *Matundua silvatica* (Purcell), Diepwalle. **b.** *Vidole capensis* (Pocock), Buffels Bay. **c.** *Pongolania pongola*, new species, holotype. **d.** *Xevioso aululata*, new species, Bergvliet. **e.** *Xevioso amica*, new species, paratype. **f.** *Namaquarachne angulata*, new species, holotype. **g.** *Namaquarachne khoikhoiana*, new species, paratype.

the basal curve of the bursa copulatrix (figs. 12e, 35e, f), but in *X. lichmadina* and *X. kulufa* it extends mesally (fig. 43c, d) along the inner, ventral side of the bursa copulatrix (Char. 93).

The internal female genitalia of several taxa, including *Namaquarachne*, *Kulalania* plus *Ambohima*, some *Xevioso*, and *Vytfutia* have a capacious bursa copulatrix (Char. 78). In *Namaquarachne* this empties into anterior, lobate receptaculum, and in *N. thaumatula*, *N. khoikhoiana* (fig. 12g), and *N. tropata* the receptaculum is developed as a blind-ending diverticulum from the junction of the bursa copulatrix and spermathecal duct (Char. 85), whereas in *N. angulata* (fig. 12f) and *N. hottentotta* the receptaculum is integral to the junction of the bursa copulatrix and spermathecal duct. The spermathecae of all *Namaquarachne* species are not capsulate, and there is a unique, free, elongate, convoluted posterior duct leading to the fertilization duct (Char. 79).

The copulatory openings (CO) are usually mesad (figs. 11a–d, 12g) of the fertilization ducts (*Amaurobius*, *Vytfutia*, *Themacrys*, *Phyxelida*, *Malaika*, *Ambohima*, *Kulalania*, and some *Namaquarachne*). Modifications of this arrangement (Char. 77) with the position of the copulatory openings even with (fig. 12a, b) or laterad of (fig. 12c–f) the fertilization ducts are derived (*Xevioso*, *Vidole*, *Matundua*, *Pongolania*, and *Namaquarachne angulata* and *N. hottentotta*).

XI. EPIGYNUM: The epigyna of *Amaurobius* and *Vytfutia* are quite different. *Amaurobius* has a large posterior median lobe (PML), whereas in *Vytfutia* (fig. 100d) the PML is not visible, even in vestigial form. A PML, usually distinct but rarely fused to the

TABLE 2

Character Set For Phyxelidine Cladograms
(figs. 13, 20, 31, 50, 69, 81)

1. *1* Thoracic fovea broad, length less than 5 times width (fig. 80a, c): *0* thoracic fovea a narrow slit, length greater than 5 times width (fig. 17a, c). State 1 is derived in parallel at node 10 for *Kulalania* plus *Ambohima* and at node 31 for *Phyxelida*, and is reversed to state 0 at node 36 for *P. mirabilis* plus *P. abyssinica.*
2. *1* Bases of at least some anterobasal setae on palpal femur enlarged (figs. 4a–f, 5a–f): *0* bases normal, not different from those of dorsal and ventral setae at same level. State 1 is a uniquely derived synapomorphy at node 1 for the Phyxelidinae.
3. *1* Anterobasal setae of palpal femur grossly enlarged, long, spindlelike (fig. 5a–f): *0* anterobasal setae relatively slender or slightly thickened, long to short (fig. 4a–d). State 1 is derived in parallel at node 3 for the Vidoleini and at node 23 for *Namaquarachne.*
4. *1* Tarsi without trichobothria: *0* tarsi with single dorsal row of trichobothria, length increasing distally. State 1 is a uniquely derived synapomorphy at node 1 for the Phyxelidinae.
5. *1* Metatarsi with single dorsal, subapical trichobothrium: *0* metatarsi with dorsal row of trichobothria. State 1 is a uniquely derived synapomorphy at node 1 for the Phyxelidinae.
6. *1* Feathery hairs present (fig. 6d): *0* all hairs simple-serrate (fig. 6c). State 1 is a uniquely derived synapomorphy for *Malaika.*
7. *1* Metatarsi III and IV (at least in male) with pro- and retroapical combs (fig. 6e): *0* apical setae of metatarsi irregular. State 1 is a uniquely derived synapomorphy at node 4 for *Vidole* plus *Pongolania* plus *Xevioso.*
8. *1* Calamistrum median to subapical, origin at greater than 0.30 from metatarsus IV base: *0* calamistrum basal, origin less than 0.25 from metatarsus IV base. State 1 is a uniquely derived synapomorphy at node 1 for the Phyxelidinae. This state is predicted to occur in the as yet unknown female of *Lamaika.*
9. *1* Male palpal coxae with basal dorsolateral triangular projection: *0* palpal coxae normal, flat dorsally. State 1 is a uniquely derived synapomorphy for *Malaika.*
10. *1* Male chelicerae with lateral, longitudinal row of spinules (fig. 7e, f): *0* chelicerae with only normal, long, slender setae laterally. This is a very homoplastic character for which the cladogram requires 6 steps. State 0 must be considered plesiomorphic, and state 1 is derived in parallel for *Lamaika,* at node 23 for *Namaquarachne* (with a reversal to state 0 for *Namaquarachne thaumatula*) and at node 15 for *Xevioso* (with in parallel reversals to state 0 for *X. aululata* and *X. tuberculata*).
11. *1* Male chelicerae with lateral striae: *0* chelicerae smooth or wrinkled laterally. State 1 is derived in parallel at node 35 within *Phyxelida* and for *Themacrys irrorata.*
12. *1* Male chelicerae with strong ventral striae (fig. 49c): *0* chelicerae smooth or weakly wrinkled ventrally. State 1 is uniquely derived at node 23 for *Namaquarachne,* is predicted to occur in the as yet unknown males of *N. hottentotta* and *N. angulata.*
13. *1* Male palpal tibia lacking retrolateral process (figs. 19d, 29c, 61b): *0* retrolateral process (RL) present (fig. 100b, c). State 1 is uniquely derived at node 2 for the Vidoleini plus Phyxelidini. This state is predicted to occur in the as yet unknown males of *Pongolania* and *Kulalania.*
14. *1* Male palpal tibia with retrodorsal sector R divided into an outer, setose lobe (R2) and an inner, smooth, sclerotized ridge (R1) or projection (fig. 67d): *0* sector R undifferentiated (fig. 58b). State 1 is uniquely derived at node 27 for *Themacrys.*
15. *1* Male palpal tibia with D process and sector R connected by a sclerotized ridge (figs. 58b, 61b): *0* area between D process and sector R convex, undifferentiated. State 1 is uniquely derived at node 8 for the *Lamaika* group, and reversed to state 0 for *Ambohima.* State 1 is predicted to occur in the as yet unknown male of *Kulalania.*
16. *1* Male palpal tibia with P enlarged and extending distally and dorsally (figs. 58b, 61b, 65b): *0* P a weak flange, or undifferentiated. It is most parsimonious to consider 0 as the plesiomorphic state with state 1 derived in parallel in *Amaurobius* and at node 8 for the *Lamaika* group. This state is predicted to occur in the as yet unknown male of *Kulalania.*
17. *1* Male palpal tibia having P with a conspicuous, dorsad-directed lobe (figs. 61b, 65b): *0* P rectangular. State 1 is uniquely derived at node 9 for the *Malaika* group, and is predicted to occur in the as yet unknown male of *Kulalania.*

TABLE 2–*Continued*

18. *1* Male palpal tibia with DA produced into an elongate, setose lobe: *0* DA sector undifferentiated or weakly differentiated. The cladogram requires that state 1 be derived in parallel 3 times: at node 12 for *Vidole* (fig. 19d), at node 31 for *Phyxelida* (fig. 79c), and for *Xevioso zuluana* (fig. 37b). This state is predicted to occur in the as yet unknown males of *Vidole lyra* and 10 species of *Phyxelida*.
19. *1* D process concave retrolaterally, lateral margins rolled inward (fig. 79d): *0* D process convex or flattened. State 1 is uniquely derived at node 31 for *Phyxelida*, predicted to occur in the as yet unknown males of 10 species, and reversed to state 0 for *P. kipia*.
20. *1* Male palpal tibia with apex of D process modified into a knob (fig. 49a, b): *0* apex of D process pointed, blunt, or flattened, without knob. State 1 is uniquely derived at node 23 for *Namaquarachne*, and is predicted to occur in the as yet unknown males of *N. hottentotta* and *N. angulata*.
21. *1* D process petiolate, apical knob large, clavate, directed dorsally and ventrally (fig. 53a, b): *0* D process tapering to apex, knob small (fig. 55b, c). State 1 is uniquely derived at node 26 for *Namaquarachne thaumatula* plus *N. khoikhoiana*.
22. *1* Male palpal tibia of *Namaquarachne* with R sector produced, anterior margin sclerotized (fig. 51b): *0* R sector not produced or conspicuously sclerotized (fig. 55b). State 1 is uniquely derived at node 26 for *Namaquarachne thaumatula* plus *N. khoikhoiana*.
23. *1* Male palpal tibia with D process flattened and hyaline, stretching at least basally between DA and R (figs. 21b, 32b): *0* D process heavily sclerotized, free, convex or concave. State 1 is uniquely derived at node 4 for *Vidole* plus *Xevioso*, is predicted to occur in the as yet unknown male of *Pongolania*, and reversed in parallel to state 0 in *Xevioso zuluana* and *X. aululata*.
24. *1* Male palpal tibia with DA sector extending past apex of D process, setose to apex: *0* apex of DA even with or proximad of apex of D process. This is a highly homoplastic character, with the cladogram requiring 5 steps: state 1 is derived in parallel for *Xevioso zuluana* (fig. 37b), at node 12 for *Vidole* (fig. 19d) (and predicted to occur in the as yet unknown male of *V. lyra*) and twice in *Phyxelida* for *P. carcharata* (fig. 89b) and at node 34 (fig. 82b); a reversal to state 0 is required for *Phyxelida abyssinica* (fig. 84b).
25. *1* Apex of DA prolonged as an acutely pointed, smooth, heavily sclerotized (DAS) process (figs. 39b, 41b): *0* apex of DA rounded, setose. State 1 is uniquely derived within *Xevioso* at node 17 for *X. colobata* plus *X. aululata*.
26. *1* Hyaline D process prolonged medially into a slender, twisted (Df) flange (figs. 29c, 32b): *0* anterior margin of hyaline D process gently curved. State 1 is uniquely derived within *Xevioso* at node 21.
27. *1* Hyaline D enlarged, extending broadly to apex of DA, and extending retrolaterad as a broad lobe (figs. 42b, 45b): *0* hyaline D process small, not produced as a retrolateral lobe. State 1 is uniquely derived at node 19 for *Xevioso lichmadina* plus *X. kulufa*.
28. *1* Male metatarsus I with retrolateral, subbasal spur surmounted by spine, distad of this a retrolateral concavity (fig. 8a): *0* metatarsus I convex, unmodified. This is a homoplastic character, with the cladogram requiring 4 steps: state 1 is a uniquely derived synapomorphy at node 1 for the Phyxelidinae, and is reversed in parallel at node 3 for the Vidoleini (state 0 is predicted to occur in the as yet unknown male of *Pongolania*), at node 9 for the *Malaika* group state 0 is predicted to occur in the as yet unknown male of *Kulalania*; the prolateral processes on metatarsi I and II of *Ambohima* are not considered homologous with state 1), and at node 32 for *Phyxelida sindanoa* plus *P. carcharata*.
29. *1* Male metatarsus I with subbasal, prodorsal, retrolaterad-directed spear-shaped process with a terminal pore (fig. 8b, c): *0* metatarsus I with no such process. State 1 is uniquely derived within *Themacrys* at node 29, and is predicted to occur in the as yet unknown male of *T. ukhahlamba*.
30. *1* Male metatarsus I with dorsomedian carina with longitudinal row of very stout spinules (fig. 78b, d): *0* without dorsal, longitudinal row of spinules. State 1 is uniquely derived at node 28 for *Themacrys irrorata* plus *T. cavernicola*.
31. *1* Male metatarsus I sinuate in lateral view distad of concavity, directed first ventrally and then dorsally (fig. 97a, c): *0* metatarsus I straight or weakly curved in lateral view. State 1 is uniquely derived at node 40 for *Phyxelida tanganensis* plus *P. bifoveata*.
32. *1* Male metatarsus I concavity with weak mound covered with group of short, stiff setae (fig. 97b, d): *0* metatarsus I concavity smoothly concave, without such setae. State 1 is uniquely derived at node 40 for *Phyxelida tanganensis* plus *P. bifoveata*.

TABLE 2–*Continued*

33. *1* Male metatarsus I with stout spinules (fig. 8d): *2* male metatarsus I with fine spinules (fig. 7c, d): *0* male metatarsus I without spinules. This is a very homoplastic character, with the cladogram requiring 9 steps. From the plesiomorphic absence (0) of spinules, fine spinules (2) are derived in parallel within *Namaquarachne* at node 26 and within *Xevioso* at node 16; within *Xevioso* fine spinules are modified into stout spinules (1) in parallel twice for *X. colobata* and *X. zuluana*, and lost at node 22 for *X. orthomeles* plus *amica*. Stout spinules are derived in parallel within the Phyxelidini at node 7 (and predicted to occur in the as yet unknown male of *Kulalania*), lost in parallel for *Malaika* and at node 31 for *Phyxelida*, and rederived at node 34 for the *makapanensis* group. Little phylogenetic weight may be placed upon this character.
34. *1* Male metatarsus I with dorsad-produced triangular lobe, distad of this a lateral kink in metatarsus (figs. 7b, 33a–d): *0* metatarsus I convex, unmodified. State 1 is uniquely derived within *Xevioso* at node 16 and lost in *X. orthomeles*.
35. *1* Male metatarsus I dorsal triangular projection precipitous or overhanging distally (fig. 47a, b): *0* dorsal triangular process sloping distally (fig. 44a–d). It is most parsimonious to consider state 1 plesiomorphic within *Xevioso*, with state 0 uniquely derived at node 19 for *X. lichmadina* plus *X. kulufa*.
36. *1* Male metatarsus I with small dorsal lobe distal to triangular lobe (fig. 33a, c): *0* without small dorsal lobe distal to triangular lobe. State 1 is uniquely derived within *Xevioso* at node 20 and reversed at node 22 for *X. orthomeles* plus *X. amica*.
37. *1* Male metatarsus I with dorsal triangular lobe prolonged and narrowed to a point (fig. 40a–d): *0* lobe triangular. State 1 is derived in parallel within *Xevioso* for *X. zuluana* (fig. 33a) and at node 17 for *X. colobata* plus *X. aululata*.
38. *1* Male metatarsus I of *Xevioso* with spinules extending far distad of dorsal process (fig. 40a–d): *0* spinules restricted to vicinity of process (fig. 44a–d). The cladogram requires widespread spinules (1) to be plesiomorphic within *Xevioso*, with restricted spinules (0) uniquely derived at node 19 for *Xevioso lichmadina* plus *X. kulufa*. Spinules are absent from *X. orthomeles* plus *X. amica*, and it is likely that they were lost from the widespread configuration (see Character 33).
39. *1* Median apophysis (MA) unsclerotized: *0* median apophysis heavily sclerotized. State 1 is uniquely derived at node 1 for the Phyxelidinae, and it is implicit that the primitive median apophyses for those taxa in which they have been lost (e.g., Vidoleini, *Ambohima*) were desclerotized.
40. *1* Median apophysis subapical: *0* median apophysis retrobasal. The cladogram requires 3 steps: from the plesiomorphic state 0 state 1 is uniquely derived at node 1 as a synapomorphy for the Phyxelidinae (and implicitly primitive for the Vidoleini), and reversed in parallel in *Phyxelida kipia* (fig. 79a) and at node 8 (fig. 58a) for the *Lamaika* group (state 0 is predicted to occur in the as yet unknown male of *Kulalania*; the median apophysis is lost in *Ambohima*).
41. *1* Median apophysis with apical, sclerotized hook (figs. 58a, 60d): *0* median apophysis apex tapering or blunt. State 1 is uniquely derived at node 8 for the *Lamaika* group (and predicted to occur in the as yet unknown male of *Kulalania*; the median apophysis is lost in *Ambohima*).
42. *1* Median apophysis apex directed proximad (fig. 82a): *0* apex directed distad (fig. 100a); *2* apex directed laterad (figs. 58a, 60b). The cladogram suggests state 0 is plesiomorphic. State 1 is uniquely derived within *Phyxelida* at node 33, and state 2 is uniquely derived at node 8 for the *Lamaika* group (state 2 is predicted to occur in the as yet unknown male of *Kulalania*; the median apophysis is lost in *Ambohima*).
43. *1* Median apophysis short (figs. 48e, 58a, 73a): *0* median apophysis long (figs. 82a, 100c): *2* median apophysis platelike. It is most parsimonious to consider state 1 as plesiomorphic for the Phyxelidinae, with state 0 derived in parallel in *Vytfutia* and within *Phyxelida* at node 33 (and predicted to occur in the as yet unknown males of 8 species of *Phyxelida*). A short median apophysis (1) is implicitly primitive for the Vidoleini. The platelike median apophysis of *Amaurobius* is probably a synapomorphy for the Amaurobiinae.
44. *1* Median apophysis flattened, triangular (figs. 67b, 73a): *0* median apophysis cylindrical (figs. 82c, 88c). State 1 is uniquely derived at node 27 for *Themacrys* (and predicted to occur in the as yet unknown male of *T. ukhahlamba*).
45. *1* Median apophysis absent: *0* present. The median apophysis has been lost in parallel at node 3 for the Vidoleini (it is predicted to not occur in the as yet unknown male of *Pongolania*), within *Namaquarachne* at node 26 for *N. thaumatula* plus *N. khoikhoiana*, and in *Ambohima*.
46. *1* Pars pendula (PP) elongated into a flexible, unsclerotized, easily detached lamella free from

TABLE 2–*Continued*

embolus for most of length (figs. 9, 60e): *0* pars pendula basal, unmodified, fused to embolus. State 1 is uniquely derived at node 6 for the Phyxelidini (and predicted to occur in the as yet unknown male of *Kulalania*).

47. *1* Conductor (C) with groove in which embolus fits distally (figs. 9, 48d, 67a): *0* conductor associated only with embolic apex, without a groove. State 1 is uniquely derived at node 6 for the Phyxelidini (and predicted to occur in the as yet unknown male of *Kulalania*).
48. *1* Grooved conductor a broad apical lobe, as large as tegulum (figs. 9, 62a, 65a): *0* conductor smaller then tegulum (figs. 10a, 58a, 100a). State 1 is uniquely derived at node 7 for *Themacrys*, *Phyxelida*, and the *Lamaika* group (and predicted to occur in the as yet unknown males of incertae sedis and *Kulalania*).
49. *1* Apex of grooved conductor twisted proximad, median: *0* apex of grooved conductor retrolateral. State 1 has been derived in parallel at node 26 for *Namaquarachne thaumatula* plus *N. khoikhoiana* (fig. 51a) and for *Ambohima* (fig. 65d).
50. *1* Tegulum swollen, hemispherical (figs. 48a, 51c): *0* tegulum oval or triangular. State 1 is uniquely derived at node 23 for *Namaquarachne* (and predicted to occur in the as yet unknown males of *N. hottentotta* and *N. angulata*).
51. *1* Apex of grooved conductor (CA) with outer subapical rounded (CAF) flange (figs. 9, 67a): *0* apex of grooved conductor tapering, without such a flange. State 1 is uniquely derived at node 27 for *Themacrys* (and predicted to occur in the as yet unknown male of *T. ukhahlamba*).
52. *1* Distal part of grooved conductor (CA) a separate, sclerotized, basally wrinkled lobe with a sharply pointed apex (fig. 60d): *0* distal part of grooved conductor integral. State 1 is uniquely derived for *Malaika*.
53. *1* Apex of grooved conductor elongate, very slender, acutely pointed (figs. 88a, 89a): *0* apex of grooved conductor tapering to blunt. State 1 is uniquely derived within *Phyxelida* at node 32 for *P. sindanoa* plus *P. carcharata*.
54. *1* Conductor greatly hypertrophied, twice as large as tegulum (figs. 62a, 65a): *0* conductor less than twice as large as tegulum. State 1 is uniquely derived at node 9 for the *Malaika* group (and predicted to occur in the as yet unknown male of *Kulalania*).
55. *1* Conductor fully sclerotized, cup-shaped, with median concavity (figs. 10a, b, 29b, d): *0* conductor mostly unsclerotized, shape not as described. State 1 is uniquely derived at node 3 for the Vidoleini (and predicted to occur in the as yet unknown male of *Pongolania*).
56. *1* Cup-shaped conductor with apical, hyaline fringe, usually with fimbriate margin (figs. 25c, 29d): *0* cup-shaped conductor entirely opaque (fig. 18a). State 1 is uniquely derived at node 4 for *Vidole* plus *Xevioso*, predicted to occur in the as yet unknown male of *Pongolania*, and reversed in parallel in *Xevioso jocquei* and *X. zuluana*.
57. *1* Cup-shaped conductor with broad, transverse sclerotized (CL) ridge (figs. 10a, b, 29b): *0* cup-shaped conductor without such a ridge. State 1 is uniquely derived at node 4 for *Vidole* plus *Xevioso* (and predicted to occur in the as yet unknown male of *Pongolania*).
58. *1* Basal transverse ridge of cup-shaped conductor (CL) with a median mound on distal margin (figs. 32a, 34a): *0* distal margin of transverse ridge (CL) straight. State 1 is uniquely derived within *Xevioso* at node 20.
59. *1* Embolus a spiral (fig. 29b): *0* embolus gently curved. State 1 is uniquely derived at node 15 for *Xevioso*.
60. *1* Embolus flattened, blade- or ribbonlike: *0* embolus spinelike. The cladogram requires that from the primitive state 1 (occurring in *Amaurobius* and *Vytfutia*) state 0 is uniquely derived at node 2 for the Vidoleini plus Phyxelidini, and flattened emboli are independently derived in *Matundua* (fig. 18c) and *Phyxelida bifoveata* (fig. 96a).
61. *1* Embolus short, stout (figs. 39a, 41a): *0* embolus slender. State 1 is uniquely derived within *Xevioso* at node 17 for *X. colobata* plus *X. aululata*.
62. *1* Embolus with broad, membranous pars pendula attached for much of length (figs. 42c, 45a): *0* pars pendula attached only at base of embolus. State 1 is uniquely derived at node 19 for *Xevioso X. lichmadina* plus *X. kulufa*.
63. *0* Embolic origin retrolateral: *1* embolic origin basal: *2* embolic origin proapical. This is a highly homoplastic character, with the cladogram requiring 6 steps. State 2 is plesiomorphic, and state 1 is derived in parallel in *Vidole helicigyna* and at node 6 for the Phyxelidini. From node 6 state 0 is derived for *Ambohima*, reversal to state 2 occurs at node 31 for *Phyxelida*, and reversal to state 1 occurs for *P. abyssinica*. State 0 is derived in parallel in *Vytfutia*.

TABLE 2–*Continued*

64. *1* Swelling or protuberance (PTP) at embolic base (figs. 79a, 84a): *0* no such protuberance at embolic base. State 1 is uniquely derived within *Phyxelida* at node 34 for the *makapanensis* group.
65. *1* Tegular margin heavily sclerotized, produced (EBS) distad of embolic base (figs. 10a, b, 29b, c): *0* tegulum not produced as sclerite near embolic base. State 1 is uniquely derived at node 3 for the Vidoleini (and predicted to occur in the as yet unknown male of *Pongolania*).
66. *1* EBS produced laterad of embolic base (figs. 29b, c, 32a): *0* EBS produced mesad of embolic base (figs. 21a, 23a). It is most parsimonious to consider state 1 as plesiomorphic, and state 0 uniquely derived at node 12 for *Vidole* (and predicted to occur in the as yet unknown male of *V. lyra*).
67. *1* EBS with broad, ventromedian branch (EBM) extending across middle of bulb (figs. 19b, 23a): *0* EBS simple or bifid, without such a branch. State 1 is uniquely derived at node 12 for *Vidole* (and predicted to occur in the as yet unknown male of *V. lyra*).
68. *1* Apex of EBS divided (figs. 27a, 39a, 42a, 46a): *0* apex of EBS a simple half cylinder (figs. 29c, 32a). The cladogram suggests that state 1 is plesiomorphic, and state 0 is derived in parallel in *Vidole helicigyna* and within *Xevioso* at node 21.
69. *1* Tegulum with median, longitudinal sclerotized sector (fig. 41a) from which various processes (TA1, TA2, TA4, TA5) may arise, conductor origin from unsclerotized cuticle (from which TA3 and TA3a may arise) along retrolateral margin of tegulum: *0* tegulum without median sclerotized sector mesad of conductor origin. State 1 is uniquely derived at node 3 for the Vidoleini (and predicted to occur in the as yet unknown male of *Pongolania*).
70. *1* Apex of tegular sector 3 produced as ridge (TA4) or lobe (fig. 29e): *0* apex of tegular sector 3 not produced, or absent. State 1 is uniquely derived at node 4 for *Vidole* and *Xevioso* (and predicted to occur in the as yet unknown male of *Pongolania*), and reversed in *Vidole helicigyna*.
71. *1* Tegular sector 3 with small, lightly sclerotized, acutely pointed, basomedian (TA1) process (fig. 39a): *0* TA1 absent (fig. 41a): *2* TA1 conical, heavily sclerotized (figs. 19c, 27a, 29e). The cladogram requires 3 steps with a sclerotized TA1 process (2) derived in parallel at node 14 for *Vidole capensis* and *V. schreineri*, and an unsclerotized TA1 process (1) derived within *Xevioso* at node 16. Within *Xevioso* this is modified in parallel to a sclerotized TA1 process (2) at node 21.
72. *1* Tegular sector 3 with projection (TA2) at retrodistal margin of sector (figs. 19c, 29e): *0* absent. State 1 is uniquely derived at node 4 for *Vidole* and *Xevioso* (and predicted to occur in the as yet unknown male of *Pongolania*) and reversed in *Xevioso zuluana*.
73. *1* Tegular sector 4, i.e., unsclerotized cuticle at base of cup-shaped conductor, with distal-directed TA3 lobe (fig. 19c): *0* TA3 cuticle convex, or undifferentiated. State 1 is uniquely derived at node 12 for *Vidole* (and predicted to occur in the as yet unknown male of *V. lyra*).
74. *1* Retrobasal portion of tegular sector 4 produced as retroventral-directed (TA3a) conical process, basal (proximal) margin of tegulum bilobed (figs. 10a, b, 18c, 29a): *0* TA3a not produced, proximal margin of tegulum entire (fig. 46c). The cladogram requires that state 1 be derived in parallel within *Xevioso* at node 16 and for *Matundua* (fig. 18a).
75. *1* Spermathecae with elongate, blind, ending chamber (ASD) communicating anteriorly or laterally with bursa copulatrix (figs. 12a, b, 18e, 24c): *0* receptaculum simple or otherwise, bursa copulatrix not communicating with elongate duct. State 1 is derived in parallel at node 16 for *Vidole* (where it is longitudinal) and in *Matundua* (where it is transverse).
76. *1* ASD with subapical, lateral diverticulum (fig. 26e, f): *0* ASD entire. State 1 is uniquely derived at node 14 for *Vidole capensis* plus *V. schreineri*.
77. *0* Copulatory openings mesad of fertilization ducts (figs. 11a–d, 12g): *1* copulatory openings even with fertilization ducts (fig. 12a, b): *2* copulatory openings laterad of fertilization ducts (fig. 12c–f). The cladogram requires 4 steps for this character. The primitive state is 0, which transforms to state 2 in *Namaquarachne* at node 24 for *N. hottentotta* and *N. angulata*, and uniquely to state 1 at node 3 for the Vidoleini. State 1 is transformed to state 2 in parallel at node 5 for *Pongolania* plus *Xevioso* and in *Vidole lyra*.
78. *1* Bursa copulatrix large, translucent, conical, or hornlike (figs. 11b, c, 12e–g): *0* cylindrical, heavily sclerotized (figs. 11a, d, 12d, 91a–h). State 1 is derived in parallel 4 times: at node 10 for *Kulalania* plus *Ambohima*, at node 23 for *Namaquarachne*, within *Xevioso* at node 18, and for *Vytfutia*.
79. *1* Spermathecae extensively developed and convoluted posteriad of copulatory openings and receptaculum, not capsulate (fig. 12f, g): *0* spermathecal ducts, if convoluted, largely even with or anterior of copulatory openings (fig. 11b, c), and within capsule (figs. 11a, 12e). State 1 is uniquely derived at node 23 for *Namaquarachne*.
80. *1* Receptaculum bichambered, with bursa copulatrix emptying into median afferent chamber and

TABLE 2–*Continued*

lateral efferent chamber leading to fertilization duct (figs. 11d, 91a–d): *0* receptaculum simple (fig. 12b); *2* receptaculum bichambered, with bursa copulatrix emptying into lateral afferent chamber and with median efferent chamber leading to fertilization duct (fig. 11a, c). State 0 is primitive. State 1 is uniquely derived within the Phyxelidini at node 11. State 2 is derived in parallel 3 times for *Matundua*, *Pongolania*, and *Vidole lyra*.

81. *1* Apex of bichambered receptaculum narrowed (figs. 11d, 72c, d): *0* apex broad (fig. 74d, e). State 1 is derived in parallel at node 30 for *Themacrys silvicola* plus *T. ukhahlamba* and for *Phyxelida carcharata*.
82. *1* Lateral efferent chamber lobate (fig. 91e–h): *0* lateral efferent chamber simple (fig. 91a–d). State 1 is uniquely derived within *Phyxelida* at node 38 for the *tanganensis* group.
83. *1* Lateral efferent chamber with dorsal, posterior chamber (fig. 91e, f, h): *0* lateral efferent chamber without dorsal chamber. State 1 is uniquely derived within *Phyxelida* at node 39.
84. *1* Lateral efferent chamber convoluted (figs. 91h, 93a–e): *0* lateral efferent chamber simple. State 1 is derived in parallel within *Phyxelida* at node 41 and for *P. fanivelona*.
85. *1* Receptaculum developed as a blind-ending diverticulum from junction of bursa copulatrix and spermathecal ducts (fig. 12g): *0* receptaculum not diverticulate (fig. 12f). State 1 is uniquely derived within *Namaquarachne* at node 25.
86. *1* Bursa copulatrix an elongate duct extending dorsally over receptaculum and emptying into receptaculum anterolaterally (fig. 93b–e): *0* bursa copulatrix emptying into receptaculum mesally, posteriorly, or otherwise. State 1 is uniquely derived within *Phyxelida* at node 42.
87. *1* Anterior margin of receptaculum bilobed (figs. 91e–h, 93a): *0* anterior margin of receptaculum rounded or truncate. State 1 is uniquely derived within *Phyxelida* at node 37 and lost at node 42.
88. *0* Spermathecae simple, not spiraled (figs. 11d, 12a–d): *1* Spermathecae (left) with counterclockwise spiral (figs. 11c, 12e): *2* Spermathecae (left) with clockwise spiral (fig. 11a, b). The plesiomorphic state is 0. State 2 is uniquely derived at node 9 for the *Malaika* group, and modified to state 1 in *Ambohima*. State 1 is derived in parallel within *Xevioso* at node 18 and in *Vidole helicigyna*.
89. *1* In Phyxelidini with spiraled spermathecae, spermathecal duct unitary, external afferent duct spirals apically, and then reverses as straight, internal efferent duct (fig. 11a, b): *0* efferent chamber joining 1st spiral beyond basal (fig. 11c). State 0 is uniquely derived in *Ambohima*.
90. *2* In Vidoleini with spiraled spermathecae, spermathecal duct unitary, external afferent duct spirals apically, and then reverses as straight, internal efferent duct: *1* efferent chamber joining penultimate spiral: *0* efferent chamber joining 1st spiral beyond basal (fig. 12e). State 2 is plesiomorphic, state 1 is uniquely derived within *Xevioso* at node 20, and state 0 is uniquely derived within *Xevioso* at node 22.
91. *1* Apex of spiral a large, spherical bulb (fig. 43c, d): *0* not (fig. 35d–f). State 1 is uniquely derived at node 19 for *Xevioso lichmadina* plus *X. kulufa*.
92. *1* Slender, coiled hollow rod (SSG) encircling outside of spiraled bursa copulatrix (fig. 35d–f): *0* absent (fig. 38c). State 1 is uniquely derived within *Xevioso* at node 18.
93. *1* Fertilization duct emerges mesally (fig. 43c, d): *0* fertilization duct emerges posteriorly (figs. 12e, 35e, f). State 1 is uniquely derived at node 19 for *Xevioso lichmadina* plus *X. kulufa*.
94. *1* Epigynum with paired, transverse grooves at anterior margin of posterior median lobe (PML), copulatory openings at mesal end of groove, hidden or exposed (figs. 61c, 64a, b, 72a, b): *0* epigynum without paired transverse grooves at anterior margin of PML. The cladogram requires 3 steps for this character. It is most parsimonious to assume that state 0 is plesiomorphic for the Phyxelidinae at node 1, and that state 1 in *Amaurobius* may be derived in parallel from state 0, or that state 0 for the Phyxelidinae may be derived from state 1 the outgroup. State 1 is derived in parallel within the Phyxelidini at node 7 (and predicted to occur in the as yet unknown female of *Lamaika*) and lost in *Kulalania* (fig. 64c).
95. *1* PML projecting posteriorly (figs. 61d, 62e, 74c): *0* PML posterior margin even with epigastric furrow (fig. 74a). State 1 is derived in parallel in *Malaika* and in Phyxelidini incertae sedis.
96. *1* Anterior margin of copulatory openings oblique, directed anteromesad, PML very narrow at base (fig. 64a–c): *0* otherwise (fig. 62e). State 1 is uniquely derived at node 10 for *Kulalania* plus *Ambohima*.
97. *1* Posterior median lobe (PML) with transverse, anteriad-directed pocket (figs. 49d, 52b, d): *0* PML simple, convex. State 1 is uniquely derived at node 23 for *Namaquarachne*.

TABLE 2–*Continued*

98. *1* Epigynum with anterior, depressed atrium with strong anterior rim, copulatory openings at posterior corners (figs. 19e, 24a, b): *0* epigynum flat to convex. State 1 is uniquely derived at node 12 for *Vidole*.
99. *1* Anterior rim of epigynum hiding paired, approximate pockets (fig. 26b, c): *0* absent (fig. 26a). State 1 is uniquely derived within *Vidole* at node 13.
100. *1* Epigynum with paired anterior pockets with sclerotized mesal rim and inconspicuous anterolateral rim (fig. 28a, b): *0* epigynum with only 1 pair of openings. State 1 is uniquely derived for *Pongolania*.
101. *1* Posterior median lobe (PML) narrow, length greater than width (fig. 43a, b): *0* PML broad, length less than width (fig. 35a–c). State 1 is uniquely derived at node 19 for *Xevioso lichmadina* plus *X. kulufa*.

lateral lobes, is universal in phyxelidines. In some amaurobiines the PML may be reduced (e.g., *Callobius bennetti*) or even lost altogether (e.g., *Callioplus hoplites*). In *Amaurobius* the PML is a nearly separate sclerite, whereas in phyxelidines it is at least firmly attached anteromedially. It is likely that the PML is plesiomorphic for the Amaurobiidae.

The epigyna of the Amaurobiinae are simple, flat, or convex plates, with a single pair of copulatory openings located anteriad of the PML; this configuration also occurs widely within the Phyxelidinae; therefore, modifications of the epigynal plate, wherever occurring, are interpreted as derived. The PML in many Amaurobiinae is broad and oval with the copulatory openings at the anterior margin. The configuration of the PML in *Themacrys*, *Phyxelida*, *Ambohima*, and *Malaika* is of this type, but an arrangement in which the copulatory openings are hidden in grooves at the anterior margin of the PML (figs. 61c, 64a, b, 72a, b) is unique to these genera, and may represent a synapomorphy (Char. 94) for them. The anterior margins of the copulatory openings in most Phyxelidini are transverse or directed posteromedially, but in *Kulalania* (fig. 64c) and *Ambohima* (fig. 64a, b) the anterior margins of the copulatory openings are oblique, directed anteromesad, and rendering the PML very narrow at the base (Char. 96). The posterior margin of the PML is usually even with the epigastric groove, but in some Phyxelidini (figs. 61d, 62e, 74c) it projects posteriorly (Char. 95). In *Namaquarachne* (figs. 49d, 52b, d) the PML has an anterior-directed, broad pocket (PMP) which may or may not be associated with a median depressed atrium (Char. 97). *Vidole* has a central depressed atrium (figs. 19e, 24a, b) which is closed by an anterior rim (Char. 98). The copulatory openings are located at the posterior corners of the atrium, and the receptacula are posteriad of the atrium. This is a synapomorphy for *Vidole*, and not homologous with the depressed atrium of *Vytfutia*. Some species of *Vidole* (*V. sothoana*, *V. lyra*, *V. capensis*, and *V. schreineri*) have paired pockets (fig. 26b, c) beneath the anterior rim (Char. 99); this is unique, and is a synapomorphy for these species. *Vytfutia* (fig. 100d) has a central depressed atrium, open anteriorly and posteriorly, which is largely posteriad of the copulatory ducts; this is an autapomorphy for *Vytfutia* and not homologous to the depressed atrium of *Vidole*. In *Pongolania*, new genus, there are paired, blind-ending pockets (AO) anterior to the copulatory openings and receptacula (fig. 28a, b). These pockets are bounded internally by a translucent sac. This is unique (Char. 100), and is a synapomorphy for this genus. The PML is broader than long in *Amaurobius fenestralis* and most Phyxelidinae (fig. 35a–c), but a greatly narrowed PML (fig. 43a, b) occurs in some *Xevioso* (Char. 101). There are various other unique modifications of the epigynal plate which are presumably autapomorphies for those taxa possessing them: (a) the lateral transverse groove of *Matundua* (fig. 18d); (b) the median mounds or lobes of *Xevioso zuluana* (fig. 38a); (c) the transverse ridges occurring in *Xevioso auluata* (fig. 38d), *Phyxelida makapanensis* (fig. 90e), *P. apwania* (fig. 99e), and *P. bifoveata*; and (d) the anterior, weak depressions of *Phyxelida bifoveata* (fig. 99a).

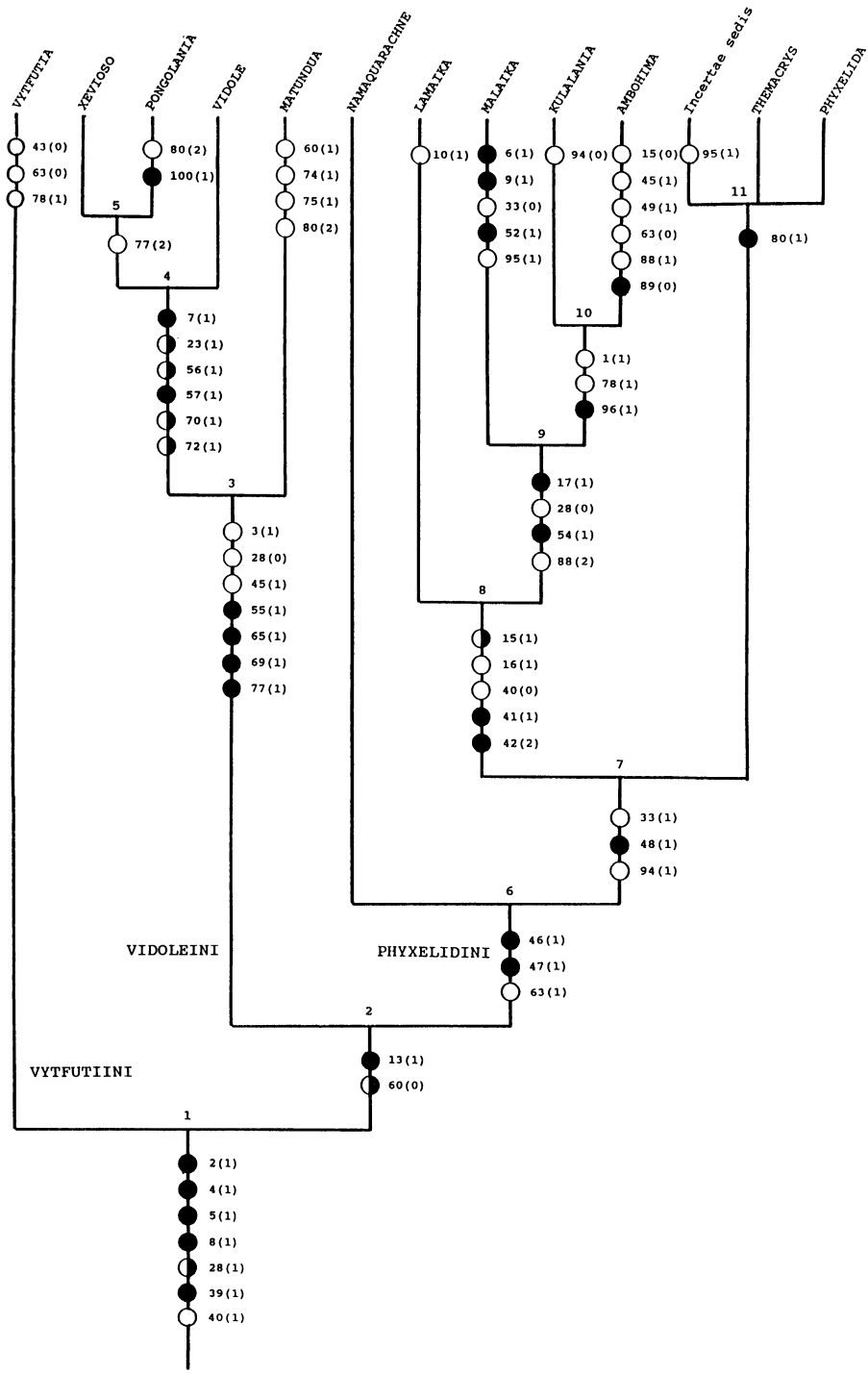

Fig. 13. Cladogram for the genera of the Phyxelidinae (shaded circles: unique synapomorphies; half-shaded circles: uniquely derived characters which are subsequently reversed; open circles: homoplasy). Characters supporting monophyly of *Xevioso*, *Vidole*, *Namaquarachne*, *Themacrys*, and *Phyxelida* are depicted on separate cladograms for those genera.

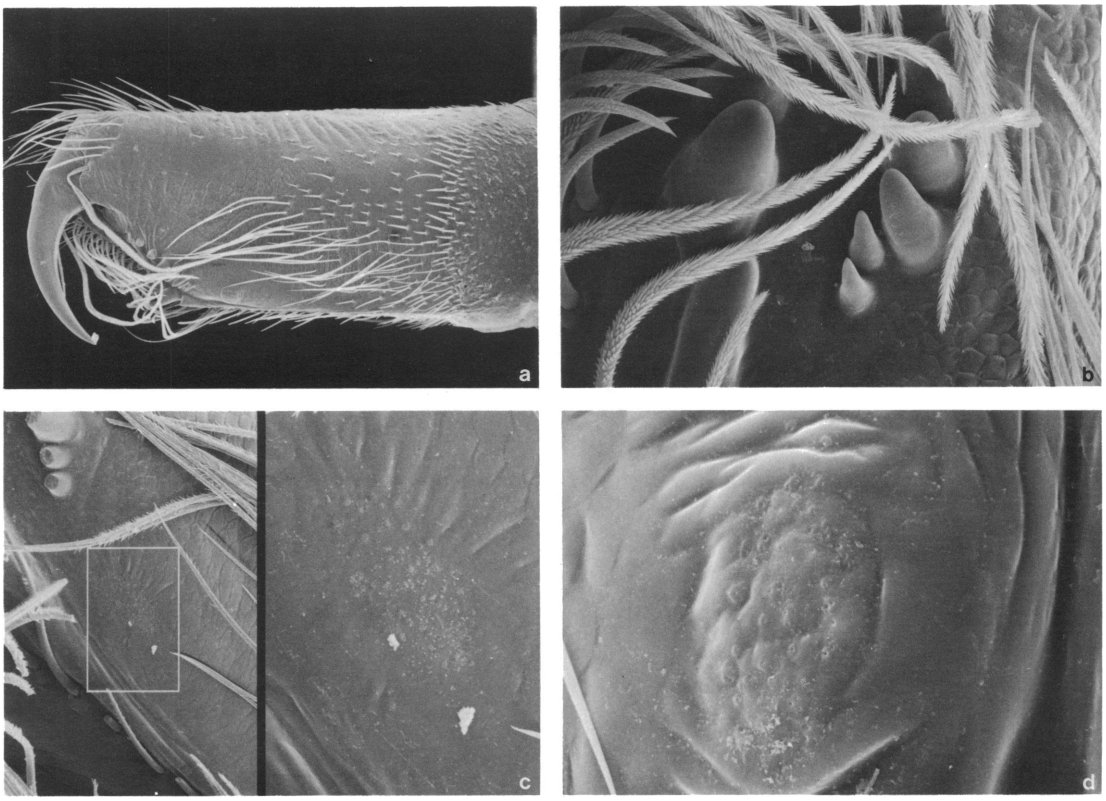

Fig. 14. *Xevioso amica*, new species, False Bay, male chelicerae. **a.** Whole chelicera, posterior view. **b.** Distal teeth along fang furrow, retromargin to right. **c, d.** Cheliceral gland opening.

TAXONOMY

PHYXELIDINAE LEHTINEN

Phyxelidinae Lehtinen, 1967: 328 (type genus *Phyxelida* Simon).

DIAGNOSIS: The Phyxelidinae may be distinguished from other Amaurobiidae by having the bases of at least some prolateral setae on the palpal femur of both sexes enlarged (figs. 4a–f, 5a–f), having the calamistrum median to subapical with its origin at greater than 0.30 from metatarsus IV base, the tarsi without trichobothria and the metatarsi with a single dorsal, subapical trichobothrium. Males usually have metatarsus I modified as a clasping organ (figs. 7b, 8a, 101b).

DESCRIPTION: Small to moderately large spiders, total length 3.0–16.0 mm. Sexual dimorphism minor, females slightly larger than males. Carapace oval, length 1¼ to 1⅔ times width. Thoracic fovea longitudinal. Eight eyes in two rows (fig. 1b), AER nearly straight, PER usually weakly procurved (figs. 17a, c, 68a, c); ocular area broad, width 1⅓ to nearly 5 times length, MOQ narrowed anteriorly, OQP 1⅛ to nearly twice width OQA. Chelicerae vertical, tapering to apex or weakly geniculate, lateral boss small, margin of fang furrow with long, thickened setae covered with fine filaments (fig. 14a, b; Lawrence, 1939: figs. 1c, 1d), 10–20 anterior and 1 posterior near base of fang; usually with shortened dorsobasal setae (figs. 14a, 48c); fang furrow with 2 usually heterogeneous rows of teeth (fig. 14b), denticles absent; cheliceral gland opening (fig. 14c) flat, with several small pores (fig. 14d). Labium (fig. 80b) square to rectangular, usually with prominent basal

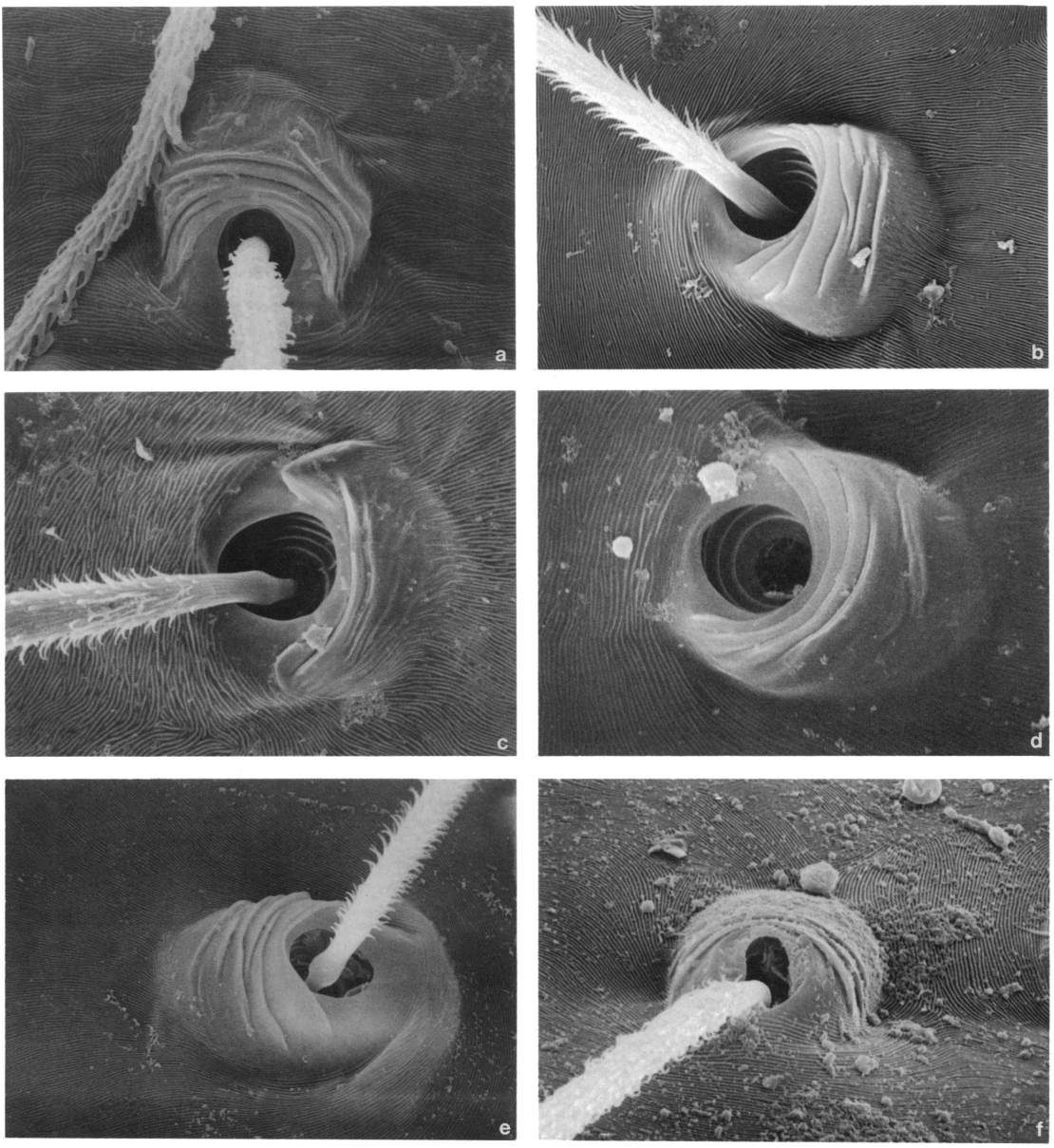

Fig. 15. Phyxelidinae females, trichobothrial bases. **a.** *Vytfutia bedel* Deeleman-Reinhold, paratype, metatarsus I. **b.** *Xevioso amica*, new species, False Bay, tibia IV. **c.** *Themacrys silvicola* (Lawrence), Town Bush, palpal tibia. **d.** *Vidole capensis* (Pocock), Buffels Bay, palpal tibia. **e.** *Phyxelida makapanensis* Simon, paralectotype, palpal tibia. **f.** *Malaika longipes* (Purcell), Skeleton Gorge, tibia IV.

notch, rarely (*Vytfutia*) weakly notched or unnotched. Palpal coxae rectangular, nearly parallel; serrula a single row (fig. 6f). Sternum oval to heart-shaped, length 1 to 1 1½ times width. Legs medium to long, length of femur I 1 to 3 times carapace width; trochanters unnotched or with very weak notch; tarsal organ subapical or rarely median, pitlike, flush with integument or with weakly raised rim, with pore at bottom of pit (fig. 16a–d); tibiae with 2 dorsolateral rows of trichobothria, metatarsi with one apical, dorsal trichoboth-

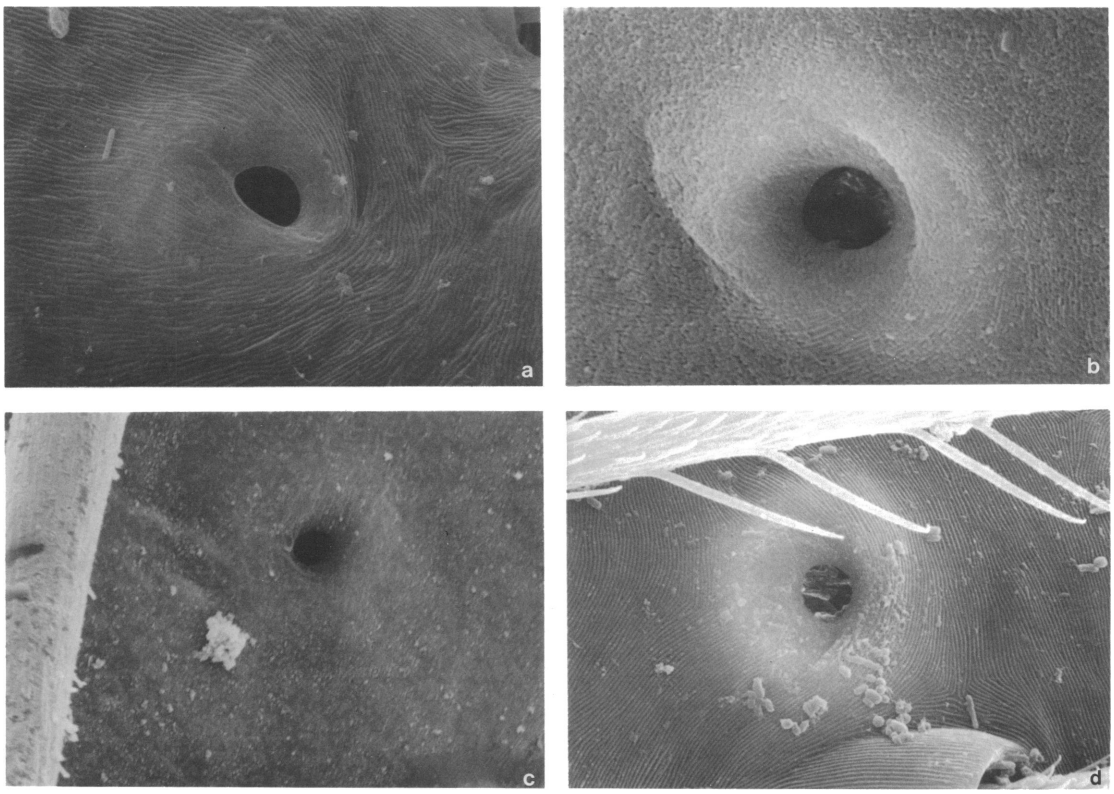

Fig. 16. Phyxelidinae females, tarsal organs. **a.** *Vytfutia bedel* Deeleman-Reinhold, paratype, I. **b.** *Xevioso amica*, new species, False Bay, III. **c.** *Themacrys silvicola* (Lawrence), Town Bush, palpus. **d.** *Malaika longipes* (Purcell), IV, Skeleton Gorge.

rium, tarsi without trichobothria; bothrium with posterior hood broadly transversely striate, with (*Themacrys*: fig. 15c) or without lateral lobes (fig. 15a, b, d–f), distal slope smooth, weakly embedded; integument of legs finely wrinkled; setae (fig. 6c) usually plumose (sensu Lehtinen, 1975), rarely (*Malaika*: fig. 6d) feathery; calamistrum simple, median to subapical with its origin at greater than 0.30 from metatarsus IV base, relatively short, length 0.20–0.50 metatarsus length, made up of 14–80 setae, pseudocalamistrum absent or very weak (*Vidole*); tarsi with 3 claws (fig. 6a), superior tarsal claws pectinate with 5–12 teeth, inferior tarsal claws usually with 1–3 teeth, rarely (*Vytfutia*) smooth; scopulae very weak to absent. Palpus with bases of probasal setae (figs. 4a–f, 5a–f) enlarged, setae shortened, and may be greatly enlarged; female palpal claw (fig. 6b) pectinate, with 11–18 teeth; male palpal tibia with a smooth, sclerotized dorsal process (D), simple or variously modified; retrolateral process absent or rarely (*Vytfutia*: fig. 100b) present; apex of palpal tibia with setose prodorsal (DA) and retrodorsal (R) sectors which may be modified (figs. 19d, 67d). Male palpal tarsus (figs. 9, 10) with cymbium simple, cup-shaped; basal haematodocha without petiolar sclerite, with 4–5 anelli (AN); tegulum (T) usually with conical, cylindrical, or platelike desclerotized median apophysis (MA) which is flexibly attached, or median apophysis absent; tegulum may have several processes; conductor (C) flexible attached retroapically to tegulum, variously modified, at least apex of embolus (E) fitting within conductor. Abdomen (fig. 1a–d) oval, without scuta; posterior respiratory system with single median spiracle just anterior of cribellum, spiracle leads into simple, slender lateral tracheae and paired slender median trunks which may be

simple (*Vytfutia*) or branch into 2–3 trachaeoles (fig. 3a–c), tracheae limited to abdomen; cribellum (figs. 2a, b, 30a, 56a) weakly to strongly divided, width 1½ to nearly equal to that of spinnerets; 6 spinnerets (figs. 30a, 56a), anterior laterals (ALS) and posterior laterals (PLS) 2-segmented, posterior medians (PMS) unsegmented; apex of ALS (figs. 30b, 56b) with 40 to more than 60 piriform spigots and 2 major ampullate spigots at mesal margin; PMS (figs. 30c, d, 56c, d) with 15–25 separate paracribellar spigots along anterior margin, apex with 1 anteromedian minor ampullate spigot, 5–10 median aciniform spigots, and 1 posterior tubuliform spigot; apex of PLS (figs. 30f, 56e) with 1 anterolateral "amaurobiid PLS spigot" having a large cylindrical base which tapers only at extreme tip and a strongly parallel-sided, cylindrical apex (Coddington, personal commun., has discovered a nearly identical spigot on the PLS of *Callobius*), this spigot with a cuticular lobe (fig. 56f) just anterior to its base, 1 anteromedian and 1 median tubuliform spigots, and 15 to more than 25 aciniform spigots; anal tubercle protruding, covered with whorled setae (figs. 2c, d, 30e). Female genitalia entelegyne, epigynum usually with posterior median lobe (PML) separated by a suture from lateral lobes (figs. 7a, 19e, 28b, 49d, 61c), internally an apodeme forming a brace bar along this suture; fertilization duct posterior, approximate to internal bar.

KEY TO THE PHYXELIDINAE

1 Male palpal tibia without a retrolateral process; epigynum with well-defined PML, free or fused to lateral lobes (figs. 7a, 19e, 61c); copulatory ducts of bursa copulatrix longitudinal (fig. 57d–f) or short and transverse (fig. 72c, d) ... 2

– Male palpal tibia with a retrolateral process (fig. 100b, c, RL); epigynum without well-defined PML (fig. 100d); copulatory ducts of bursa copulatrix long, transverse (fig. 100e) ... *Vytfutia bedel*

2(1) Males 3

– Females 12

3(2) Metatarsus I with lateral concavity and spur surmounted by spine (figs. 8a, 83a–d) 4

– Metatarsus I without lateral concavity and spur, unmodified (figs. 22d, 87b) or otherwise modified (fig. 33a, b) 8

4(3) Metatarsus I with retrolateral concavity and spur surmounted by spine (figs. 8a, 83a–d), leg II unmodified 5

– Metatarsus I with prolateral concavity and spur surmounted by spine, metatarsus II similarly modified (fig. 66a–d) ..... *Ambohima sublima*

5(4) Palpal tibia with dorsal process (D) petiolate (figs. 49a, b, 51b), with the apex modified into a knob (*Namaquarachne*) 22

– Palpal tibia with dorsal process (D) cylindrical, tapering, or blunt, apex not modified into a knob 6

6(5) Apex of conductor tapering, directed retrolaterad (figs. 60f, 67a) 7

Apex of conductor elongate, flattened, and extending proximad (fig. 58a, c) ..... *Lamaika distincta*

7(6) MA directed proximad, cylindrical (fig. 82a); palpal tibia with dorsal apex produced into an elongate, setose (DA) lobe (fig. 79c); R sector undifferentiated (*Phyxelida*) 29

– MA directed retrolaterad, flattened, triangular (figs. 67b, 70a); palpal tibia with dorsal apex undifferentiated; R sector divided (figs. 67d, 73b) into an outer setose lobe (R2) and an inner, asetose, sclerotized ridge (R1) or projection (*Themacrys*) 53

8(3) Conductor (C) a broad apical lobe with a marginal groove (figs. 60a, 88c) into which embolus fits; with a flexible, free or readily detached lamella arising near embolic base and associated with embolus for most of length (figs. 9, 60e) 9

– Conductor (C) fully sclerotized, cup-shaped with a median concavity (figs. 10, 18c, 29b), and associated only with apex of embolus; without a separate lamella associated with embolus 10

9(8) Palpal coxae with a basal dorsolateral triangular projection; palpal tibia with P an enlarged, dorsad-directed lobe (fig. 61b), dorsal apex undifferentiated; distal part of conductor a separate, sclerotized, basally wrinkled lobe with a sharply pointed apex (fig. 60d, f) (*Malaika*) ... 60

– Palpal coxae unmodified; palpal tibia with dorsal apex produced into an elongate, setose (DA) lobe, P not produced (fig. 79c); apex of conductor tapering (figs. 79b, 88a) (*Phyxelida*) 29

10(8) At least posterior metatarsi with apical

combs (fig. 6e); embolus cylindrical, elongate or shortened; tegulum lacking proximad-directed process 11
– Metatarsi lacking apical combs; embolus broad, flattened (fig. 18c); tegulum with basomedian proximad-directed (TA5) process (fig. 18a) .. *Matundua silvatica*
11(10) Embolus a spiral (fig. 29a, b); EBS produced laterad of embolic base (figs. 29a, 42a) (*Xevioso*) 64
– Embolus nonspiraled (fig. 23a); EBS produced mesad of embolic base (figs. 19b, 21a) (*Vidole*) 79
12(2) Epigynum with PML convex, without pocket (figs. 7a, 19e, 61c) 13
– Epigynum with PML (figs. 49d, 52b, d) having transverse, anteriad-directed pocket (PMP) (*Namaquarachne*) .. 22
13(12) Epigynum flat to convex, without anterior depressed atrium 14
– Epigynum with anterior depressed atrium with strong anterior rim, copulatory openings at posterior corners (figs. 19e, 24a, b) (*Vidole*) 79
14(13) Epigynum with anterior (fig. 28b) or lateral (fig. 18d) openings or grooves in addition to the paired copulatory openings 15
– Epigynum with paired copulatory openings only 16
15(14) Epigynum with paired anterior blind-ending openings (AO) with sclerotized mesal rim and inconspicuous anterolateral rim (fig. 28a, b); at least posterior metatarsi with apical combs (fig. 6e) (*Pongolania*) 87
– Epigynum with lateral transverse grooves (fig. 18d); metatarsi without apical combs ..... *Matundua silvatica*
16(14) Copulatory openings narrowly oval, slitlike, or hidden 17
– Copulatory openings large, triangular (fig. 64c) ..... *Kulalania antiqua*
17(16) Epigynum with PML broadly oval or trapezoidal, with paired, transverse grooves along anterior margin (figs. 64a, 72a), copulatory openings hidden or exposed at mesal end of groove (fig. 61c); copulatory openings mesad of fertilization ducts (figs. 64e, 95b) 18
– Epigynum with PML rectangular with copulatory openings exposed along anterolateral margin (figs. 7a, 38d); copulatory openings laterad of fertilization ducts (figs. 35d, e, 38c) (*Xevioso*) .. 64
18(17) Spermathecae with spiral ducts (fig. 11a–c) 19
– Spermathecae bipartite internally (fig. 11d), with median afferent and lateral efferent chambers 20
19(18) Afferent duct extending posteriad from apical spiral (fig. 11a); thoracic fovea narrow, length greater than 8 times width (fig. 68c); epigynum with PML projecting posteriorly (figs. 61d, 62e) (*Malaika*) 60
– Afferent duct extending posteriad from subbasal spiral, apical 2–8 spiral turns blind-ending (fig. 11c); thoracic fovea broad, length less than 4 times width; PML not projecting posteriorly (fig. 64a, b) (*Ambohima*) 63
20(18) Thoracic fovea narrow to slitlike, length greater than 5 times width (fig. 68a) 21
– Thoracic fovea broad, length less than 4 times width (fig. 80a, c) (*Phyxelida*) 29
21(20) Spermathecae spherical (fig. 82e) (*Phyxelida*) 29
– Spermathecae oval, cylindrical, or narrowed anteriorly (figs. 72c, d, 74d, e) (*Themacrys*) 53

NAMAQUARACHNE

22(5,12) Females 23
– Males 27
23(22) Copulatory openings lateral, longitudinal, may arise from anterolateral margin of PML (figs. 52d, 57a); PMP narrower than PML, anterior margin strongly procurved (figs. 52d, 57b) 24
– Copulatory openings central, circular, removed anteriad of PML (fig. 57c); PMP as broad as PML, anterior margin straight to weakly procurved ... . *tropata*
24(23) Anterior margin of epigynum smooth, unmodified, center flat or with weak depression; anterior margin of PMP evenly curved 25
– Anterior margin of epigynum with posterior-directed, triangular projection and central depression; anterior margin of PMP with lateral, anterior-directed points, angled in center (fig. 57b) ..... *angulata*
25(24) PMP broad, at least one half PML width; copulatory openings large, anterior, longitudinal 26
– PMP very narrow, less than one third PML width; copulatory openings small, lateral (fig. 57a) .. *hottentotta*
26(25) Copulatory openings with ventral rim

lateral and dorsal rim median (fig. 52d) ..... *thaumatula*

– Copulatory openings with ventral rim median and dorsal rim lateral (fig. 52b) ..... *khoikhoiana*

27(22) Metatarsus I with stout clasping spine situated on a large, retrolateral apophysis (fig. 54b, c); conductor folded, apex tapering and extending to middle of tegulum (fig. 51a); tegulum without processes; palpal tibial process with large, rectangular apical knob (figs. 51b, 53c) 28

– Metatarsus I with stout clasping spine situated on a short retrolateral apophysis (fig. 54e, f); conductor twisted in retrolateral view (fig. 55c), apex retrolateral; tegulum with small apical process (fig. 48e); palpal tibial process with small apical knob (fig. 55b) ... . *tropata*

28(27) Apex of conductor a rounded lobe (fig. 51a); apical knob of tibial process as long as process (fig. 51c) .. *thaumatula*

– Apex of conductor pointed (fig. 53a); apical knob of tibial process shorter than process (fig. 53c) ..... *khoikhoiana*

PHYXELIDA

29(7,9,20,21) Males 30

– Females 37

30(29) MA short, stout, directed distad (fig. 88a) 31

– MA long, directed proximad (figs. 79a, 85a) 32

31(30) Palpal tibia with D serrate, curved, close to and as long as DA (fig. 88b); apex of conductor with 2–3 weak serrations (fig. 88a) ..... *sindanoa*

– Palpal tibia with D smooth, straight, narrow, removed from and shorter than DA (fig. 89b); apex of conductor with 5 or more serrations (fig. 89a) .. *carcharata*

32(30) Chelicerae with lateral striae or wrinkles 33

– Chelicerae smooth laterally 35

33(32) MA tapering to apex, origin retrolateral (fig. 82c); apex of D pointed (fig. 84b) 34

– Origin of MA retrobasal, apex long, slender, parallel-sided, curved (fig. 86a, c); apex of D blunt, rounded (fig. 86b) ... . *kipia*

34(33) Palpal bulb with PTP basal (fig. 84a); apex of conductor sinuate, curved proximally, then distally; no space between conductor and retroapical margin of tegulum; apex of cymbium blunt; D much longer than DA (fig. 84b); metatarsus I clasping spine sinuate (fig. 83c) .... *abyssinica*

– Palpal bulb with PTP median (fig. 82a); apex of conductor straight, twisted; subtegulum visible between conductor and retroapical margin of tegulum; apex of cymbium tapering; DA longer than D (fig. 82b); metatarsus I clasping spine nearly straight (fig. 83a) ..... *mirabilis*

35(32) Embolus broad, lamellate (fig. 96a) .... *bifoveata*

– Embolus a slender, curved spine (fig. 85c) 36

36(35) Apex of conductor slender, sinuate (fig. 98a); D much longer than DA (fig. 98b) ..... *tanganensis*

– Apex of conductor stout, straight (fig. 85a); DA as long as D (fig. 85b) .... *makapanensis*

37(29) Copulatory duct long, extending around dorsally to anterior margin of spermathecae (fig. 93b–e) 38

– Copulatory duct short, joining spermathecae posteriorly or medially (figs. 91a–h, 93a) 42

38(37) Epigynum width less than 3 times length 39

– Epigynum very broad, width greater than 4 times length (fig. 95a) .... *eurygyna*

39(38) Anterior lobe of spermathecae bulbous, chamber nearly spherical (fig. 93d, e) 40

– Anterior lobe of spermathecae trapezoidal, chamber complex (fig. 93b, c) 41

40(39) Posterior margin of PML straight (fig. 94a); anterior bulb of spermathecae stout, posterior lobe transverse (fig. 94c) .... *nebulosa*

– Posterior margin of PML convex, angled laterally (fig. 94b); anterior bulb of spermathecae slender, posterior lobe oblique to longitudinal (fig. 94d) ..... *irwini*

41(39) Copulatory ducts long and slender (fig. 95d); anterior chamber trapezoidal (fig. 93b) ..... *umlima*

– Copulatory ducts broad (fig. 95f); anterior chamber complex, with mesal straight and median sinuate ducts (fig. 93c) ... . *crassibursa*

42(37) Spermathecae capsulate (fig. 91a–c), anterior margin truncate, curved, or with longitudinal lobes (fig. 91e–h) 43

– Spermathecae with elongate, mesad-directed lobe with terminal bulb (figs. 91d, 92c) ..... *malagasyana*

43(42) Anterior margin of spermathecae with 2

longitudinal lobes of nearly equal length, one narrower than other (fig. 91e–h) .. 44

– Anterior margin of spermathecae curved, truncate, or weakly bilobate (fig. 91a–c) .. 48

44(43) Epigynum with PML broad, width greater than twice length, sides convex ... 45

– Epigynum with PML very narrow, width less than twice length, sides concave (fig. 99e) ..... *apwania*

45(44) Anterior lobes of spermathecae dorsoventrally superimposed, anterodorsal lobe narrower than or equal to anteroventral (figs. 98e, 99b) 46

– Anterior lobes of spermathecae adjacent, median lobe slender, lateral broad (figs. 92d, 99d) 47

46(45) Spermathecae with well-defined posterior lobe; spermathecae widely separated, distance between at least two-thirds length (fig. 98e) ..... *tanganensis*

– Spermathecae without well-defined posterior lobe; spermathecae approximate, distance between less than one-fourth length (fig. 99b) ..... *bifoveata*

47(45) Spermathecae with capacious posterodorsal chamber (fig. 91h), anteromedian lobe broad (fig. 99d) ..... *fanivelona*

– Spermathecae with convoluted posterodorsal duct (fig. 93a), anteromedian lobe very slender (fig. 92d) ..... *jabalina*

48(43) Epigynum with well-developed straight or recurved LTR (figs. 90e, 99a); spermathecae with afferent chamber as large as efferent (fig. 91a–c) 49

– Epigynum without apparent LTR (fig. 90c); spermathecae with small, slender median afferent chamber (fig. 90d) ..... *anatolica*

49(48) LTR recurved; PML convex 50

– LTR straight, transverse, PML rebordered (fig. 90e) ..... *makapanensis*

50(49) Spermathecae bilobate or oblong and truncate anteriorly 51

– Spermathecae spherical (figs. 82e, 91c) .. *mirabilis*

51(50) Copulatory ducts directed posteriad (fig. 88e); epigynum with copulatory openings hidden beneath recurved LTR (fig. 89d) 52

– Copulatory ducts directed mesad (fig. 90b); epigynum with copulatory openings exposed (fig. 90a) ..... *pingoana*

52(51) Apex of spermathecae directed mesad, efferent duct lateral (fig. 89e); epigynum with sides of PML nearly parallel (fig. 89d) ..... *carcharata*

– Apex of spermathecae directed anteriad, efferent duct ventral, posterior (fig. 88e); epigynum with sides of PML convex (fig. 88d) ..... *sindanoa*

THEMACRYS

53(7,21) Males 54

– Females 57

54(53) Metatarsus I with dorsal, retrolateraddirected, spear-shaped process (figs. 8b, c, 71b, d); dorsal carina present or absent, but without row of stout thorns on crest of carina 55

– Metatarsus I without spear-shaped process; dorsal carina with row of 3–10 stout thorns on crest (fig. 78a, d) .. 56

55(54) Palpal tibia with D process long and narrow, R1+2 undifferentiated, rounded (fig. 70b); apical fold of conductor small (fig. 70c); MA long, slender, reaching to apex of conductor (fig. 70a) ..... *silvicola*

– Palpal tibia with D process conical, R1+2 differentiated, R2 elongate, R1 produced (fig. 73b); apical fold of conductor large, downcurved (fig. 73c); MA broadly triangular, not reaching to apex of conductor (fig. 73a) ..... *monticola*

56(54) Tibia I with subapical retrolateral process surmounted by stout spine; dorsal carina of metatarsus I with more than 8 stout thorns (fig. 78a, b); reservoir visible through tegular cuticle as a gentle meander (fig. 77a) ... *irrorata*

– Tibia I unmodified (fig. 78c, d); dorsal carina of metatarsus I with fewer than 4 stout thorns; reservoir visible through tegular cuticle making a tight loop (fig. 75a) ..... *cavernicola*

57(53) Epigynum with copulatory openings narrow to slitlike, or not visible externally; posterolateral chamber of spermathecae larger than or equal to anteromedian (fig. 11d) 58

– Epigynum with copulatory openings large, oval, clearly open (fig. 74a, b); anteromedian chamber of spermathecae larger than posterolateral (fig. 74d, e) ..... *monticola*

58(57) Epigynum with anterior margin of PML hidden beneath evenly curved rim (fig. 72a) 59

– Epigynum with lateral, posteriad-directed lobes overhanging anterior margin of PML (fig. 72b) ..... *ukhahlamba*

59(58) Spermathecae well separated, distance between greater than one-half their

length (fig. 76c, d) ..... *irrorata, cavernicola*

– Spermathecae approximate to contiguous, distance between less the one-third length (fig. 72c) ..... *silvicola*

MALAIKA

60(9,19) Males 61
– Females 62
61(60) Palpal tibia with R produced and sclerotized, D short, conical (fig. 62b), P process stout (fig. 61b) .... *longipes*
– Palpal tibia with R unmodified, D long and stout (fig. 63b), P process slender ..... *delicatula*
62(60) Spermathecae (fig. 62d) with afferent duct making 8 or more external spirals .. .. *longipes*
– Spermathecae (fig. 63d) with afferent duct making 6 or fewer external spirals .. .. *delicatula*

AMBOHIMA

63(19) Spermathecae with apical spiral making more than 5 turns (fig. 64d) .. *sublima*
– Spermathecae with apical spiral making fewer than 3 turns (figs. 11c, 64e) .... *pauliani*

XEVIOSO

64(11,17) Males 65
– Females 73
65(64) Metatarsus I unmodified 66
– Metatarsus I with dorsomedian projection (figs. 33, 44) 67
66(65) Tegulum (fig. 34a) divided into basal lobe and projecting TA3a; TA1 present; apex of EBS simple; chelicerae with wide, ventral wrinkles .... *orthomeles*
– Tegulum (fig. 46a) simple, without basal lobe, TA3a not developed; TA1 absent; apex of EBS tripartite; chelicerae with fine lateral striae ..... *jocquei*
67(65) Palpal tibia with no more than 1 elongate apical process, DA unmodified; embolic spiral much narrower than width of cymbium; conductor without hook; metatarsus I with 1 distinct dorsal process 68
– Palpal tibia with 2 widely separated processes (fig. 37b): an elongate DA and acutely pointed median D process; embolus a broad spiral covering width of cymbium (fig. 37a); conductor with proximal median hook; metatarsus I with 2 distinct dorsal processes (fig. 33a) ..... *zuluana*
68(67) Metatarsus I with an acute dorsal spur (fig. 40a–d); palpal tibia with DAS produced into a long, sharp point (fig. 41b); embolus making less than 1 full turn 69
– Metatarsus I dorsal projection broad and triangular; palpal tibia with DA rounded and unmodified (fig. 29c); embolus making more than 1 full turn (fig. 29b) 70
69(68) Palpal tibia with hyaline D reduced to a vestige or lost, DAS extending far beyond margin of hyaline D (fig. 39b); TA3a very long, pointed (fig. 39c); TA1 present, slender; proximal margin of conductor transverse, unmodified (fig. 39a); metatarsus I with fine spinules ..... *aululata*
– Palpal tibia with hyaline D extending for full length of DA, reaching apex of DAS (fig. 41b); TA3a short, conical (fig. 41c); TA1 absent; proximal margin of conductor with an acute, proximad-directed flange (fig. 41a); metatarsus I with stout spinules ... . *colobata*
70(68) Palpal tibia with hyaline D broad, margin gently curved or angled (fig. 45b); apex of EBS bifid (fig. 42a); embolus with lamella for much of length (fig. 45a); TA1 slender and elongate (fig. 42c) 71
– Palpal tibia with hyaline D having a slender median flange (Df) projecting distally (figs. 29c, 32b); apex of EBS simple (fig. 29b); embolus with lamella only at base; TA1 broad (figs. 29e, 32a) 72
71(70) Conductor with acute proximal flange (fig. 45c); palpal tibia with hyaline D angled (fig. 45b) ..... *kulufa*
– Conductor without proximal projection (fig. 42c); palpal tibia with hyaline D evenly curved (fig. 42b) .... *lichmadina*
72(70) Tegulum with TA3a broad, short, conical, apex bifid (fig. 32a, c) .... *tuberculata*
– Tegulum with TA3a narrow, elongate, apex acutely pointed (fig. 36a, c) .. .. *amica*
73(64) Ratio of PML length to width greater than 1 (fig. 43a, b) 74
– Ratio of PML length to width less than 1 (figs. 35a, 38d) 75
74(73) Ratio of PML length to width greater than 2 (fig. 43a) ..... *lichmadina*
– Ratio of PML length to width less than 2 (fig. 43b) ..... *kulufa*

75(73) Epigynum simple, without paired lobes or secondary depressions; bursa copulatrix small, straight or curved and horn shaped 76
– Epigynum with paired raised median lobes and shallow paired anterior depressions (fig. 38a); bursa copulatrix very large, spherical, length nearly equal to that of spermathecal capsule (fig. 38b) ..... *zuluana*
76(75) Epigynum flat to convex, with lateral margins of PML curved outward posteriorly; spermathecae with spiral duct (figs. 12e, 35d–f) 77
– Epigynum with transverse median ridge, lateral margins of PML straight (fig. 38d); spermathecae with a simple spherical chamber (figs. 12d, 38c) ..... *aululata*
77(76) Bursa copulatrix large, hornlike, expanded proximally (fig. 35d, e); SSG narrow, bulb exposed medially (fig. 35e) 78
– Bursa copulatrix small, ringlike (fig. 35f); SSG broad, bulb hidden on ventral side of spermathecae ..... *tuberculata*
78(77) Diameter of bursa copulatrix much greater than that of spiral spermathecal chamber (fig. 35e) ..... *amica*
– Diameter of bursa copulatrix about equal to that of spiral spermathecal chamber (fig. 35d) ..... *orthomeles*

VIDOLE

79(11,13) Males 80
– Females 83
80(79) Palpal bulb with EBM subquadrate (figs. 19b, 21a); embolic origin promedian; CTR a long, weak ridge (fig. 21c); palpal tibia with DA blunt and broad (fig. 19d); tibia I unmodified (fig. 22c) 81
– Palpal bulb with EBM broad, semicircular (fig. 23a); embolic origin probasal; CTR a narrow, pronounced lobe (fig. 23c); palpal tibia with DA long and narrow (fig. 23b); tibia I with apical, proventral curved spine (fig. 22a) ..... *helicigyna*
81(80) Tegulum with TA3 length equal to TA2 (figs. 25c, 27c); TA2 narrow and lobate in retrolateral view; TA1 present (fig. 19c) 82
– Tegulum with TA3 length greater than TA2 (fig. 21c); TA2 broad and quadrate in retrolateral view; TA1 absent (fig. 21a) ..... *sothoana*
82(81) Tegulum with TA2 and TA3 approximate (fig. 27c), apex of TA3 angled; EBA acute in ventral view (fig. 27a) ..... *schreineri*
– Tegulum with TA2 and TA3 widely separated (fig. 25c), apex of TA3 rounded; EBA blunt in ventral view (fig. 25a) ..... *capensis*
83(79) Epigynum with width of atrium greater than that of PML 84
– Epigynum with width of atrium about equal to that of PML 85
84(83) Anterior rim of atrium with paired, hidden pockets (fig. 24a); ASD slender (fig. 24c); spermathecae bilobed ..... *lyra*
– Anterior rim of atrium without paired, hidden pockets (fig. 26a); ASD stout, not reaching anterior rim of atrium; spermathecae with internal spiral (fig. 26d) ..... *helicigyna*
85(83) ASD converging, approximate only apically (fig. 26d,) 86
– ASD parallel for apical one-half of length (fig. 26c, f) ..... *schreineri*
86(85) ASD with subapical, anterior directed lobe (fig. 26e) ..... *capensis*
– ASD stout for entire length (fig. 24d), without subapical lobe .. *sothoana*

PONGOLANIA

87(15) Epigynum with copulatory openings longitudinal (fig. 28b); spermathecae with a large, trapezoidal ventral chamber (fig. 28d) ..... *chrysionaria*
– Epigynum with copulatory openings oblique (fig. 28a); spermathecae with a small, spherical ventral chamber (fig. 28c) ..... *pongola*

VIDOLEINI, NEW TRIBE

Type genus *Vidole* Lehtinen, 1967: 274, 330.

DIAGNOSIS: The Vidoleini may be distinguished from other Phyxelidinae by having the conductor of the male palpus (fig. 10) modified into a fully sclerotized, cuplike structure associated with the apex of the embolus, the absence of a median apophysis, the tegular margin heavily sclerotized, produced (EBS) distad of embolic base, the tegulum with four longitudinal sclerotized and unsclerotized sectors from which various processes may arise (fig. 41a), the copulatory openings of the spermathecae shifted laterad to lie even with or laterad of the fertilization ducts (fig. 12a–e), and the retrolateral spur and concavity of male metatarsus I absent.

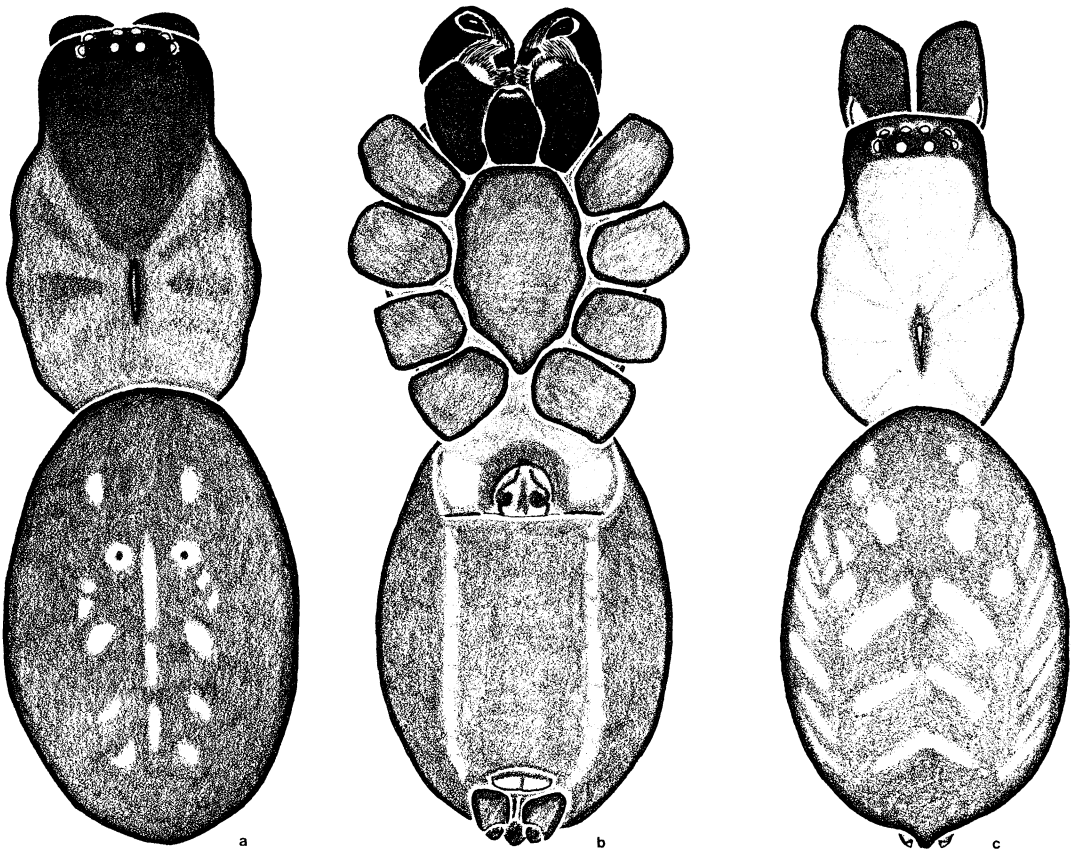

Fig. 17. Bodies of female Phyxelidinae. a, b. *Vidole capensis* (Pocock), Buffels Bay. **a.** Dorsal. **b.** Ventral. **c.** *Matundua silvatica* (Purcell), Diepwalle, dorsal.

All genera except *Matundua* have apical preening combs on metatarsi III and IV.

MATUNDUA LEHTINEN

Matundua Lehtinen, 1967: 247, 330 (type species by original designation *Auximus silvaticus* Purcell, female syntypes in SAM, examined). – Brignoli, 1983: 528.

DIAGNOSIS: Male palpus (fig. 18a, c) with cup-shaped, sclerotized conductor, embolus short, lamellate, translucent, largely hidden by median sclerite (MS); tegulum with retrolateral and basal processes; epigynum (fig. 18d) with copulatory openings (CO) at anterolateral margins of posterior median lobe, with lateral transverse external grooves; metatarsi without apical combs.

DESCRIPTION: Medium size to large spiders (figs. 1c, 17c), total length 9 to 16 mm. Body and legs hirsute. Carapace length 1.34–1.51 times width; thoracic fovea long, narrow, deep, length 0.19–0.28 carapace length; AER slightly recurved, PER straight; OA width 2.61–3.31 times length; clypeal height 2.44–3.10 times AM diameter; cheliceral length 4.42–5.82 times clypeal height, with ventral and lateral wrinkles, pro- and retromargins of fang furrow with 4–5 teeth. Sternum long, length 1.34–1.39 times width, margin sinuate, base narrowed, apex blunt; labium long, length 1.24–1.29 times width. Legs elongate, unmarked, leg formula 1423, femur I 1.46–1.74 times carapace width; metatarsi without apical combs; pseudocalamistrum very weak to absent. Abdomen with median light longitudinal band and median and posterodorsal connected light chevrons, venter with longitudinal bands narrow, entire. Palpal femur

with row of 3–4 stout anterobasal thorns; male palpal tibia (fig. 18b) with anterodorsal sector (DA) produced and narrow, and elongate dorsoapical process (D); cymbium cuplike, apex blunt; embolus (E) short, lamellate, EBS consisting of 2 small apical lobes; large, unique median sclerite (MS) largely hiding embolus, tegulum with apical cup-shaped, sclerotized conductor (fig. 18a, c). Epigynum (fig. 18d) with copulatory openings (CO) at anterolateral margins of PML, with lateral transverse external grooves; spermatheca (figs. 12a, 18e) simple, bilobate, with anterolateral cylindrical chamber; fertilization duct posterior.

COMPOSITION: One species.

DISTRIBUTION: Southern Cape Province, South Africa (fig. 103).

Matundua silvatica (Purcell)
Figures 1c, 3c, 12a, 17c, 18a–e, 103

Auximus silvaticus Purcell, 1904: 132 (lectotype and paralectotype adult females and paralectotype juvenile female, here designated, from the Knysna Forest, South Africa, SAM, examined). – Roewer, 1954: 1361. – Bonnet, 1955: 825.

Matundua silvatica: Lehtinen, 1967: 247.

NOTE: Lehtinen (1967: 247, 456, fig. 385) suggested that a male specimen from Steinkopf, Cape Province, South Africa, was conspecific with the female of *Auximus silvaticus* Purcell. The male of *A. silvaticus* Purcell, here described for the first time, is clearly distinct from the Steinkopf specimen, which is elsewhere designated as the holotype of *Namaquarachne thaumatula*, new species.

DIAGNOSIS: Male palpal tibia (fig. 18b) with narrow, elongate apical (D) process; embolus short, lamellate, hidden by large ventral flange of median sclerite (fig. 18c), tegulum with retrolateral (TA3a) and proximal TA5) processes (fig. 18a); epigynum as in fig. 18d, with copulatory openings at anterolateral margins of PML, and lateral transverse external grooves; spermathecae (figs. 12a, 18e) simple, bilobate.

MALE (Diepwalle): Total length 10.00. Carapace yellow-white, pars cephalica darker, shading to orange-brown anteriorly, lower margin of cephalic region and clypeus dark brown; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown, boss yellow-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, and trochanters yellow-white, legs and palpi yellow-white shading to yellow-brown distally, unmarked; abdomen gray, dorsum with median light longitudinal band, anterodorsal connected light spots and median and posterodorsal connected light chevrons; venter with narrow light longitudinal bands, area between these gray-brown. Carapace 4.88 long, 3.62 wide, margin entire; thoracic fovea long, deep, length 0.28 carapace; clypeus 0.35 high; ocular area 0.50 long, 1.30 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.20:1.20:1.20, diameter of PM 0.19; AM separated by ⅔ their diameter, separated from AL by 1⅛ AM; PM separated by 1⅓ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ¼ PL. Chelicerae 2.05 long, slender, with weak ventral and ventrolateral wrinkles; promargin of fang furrow with 4, retromargin with 4 large and 2 minute teeth. Sternum 2.63 long, 1.91 wide, margin sinuate, apex blunt; labium 0.99 long, 0.75 wide; palpal coxa 1.66 long, 0.66 wide. Legs elongate, femur I length 1.74 times carapace width; metatarsus I weakly sinuate distally, otherwise unmodified. Spination: leg I: femur d0-0-1-0, p0-0-1-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg III: femur d0-1-1-0, p0-1-0-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-0-0-2, v0-2-2-1, r0-1-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	6.31	5.44	4.88	5.94	2.81
Patella	2.06	1.88	1.75	1.81	1.00
Tibia	5.75	4.25	3.56	5.19	1.06
Metatarsus	6.31	4.56	3.88	5.63	–
Tarsus	2.50	2.06	1.69	2.00	2.00
Total	22.93	18.14	15.76	20.24	6.87

Palpal femur with basal group of 4–5 minute and row of 3 stout anterobasal thorns; palpal tibia (fig. 18b) with DA sharp, with narrow, elongate sclerotized apical (D) process; embolus (E) median in origin, short, lamellate,

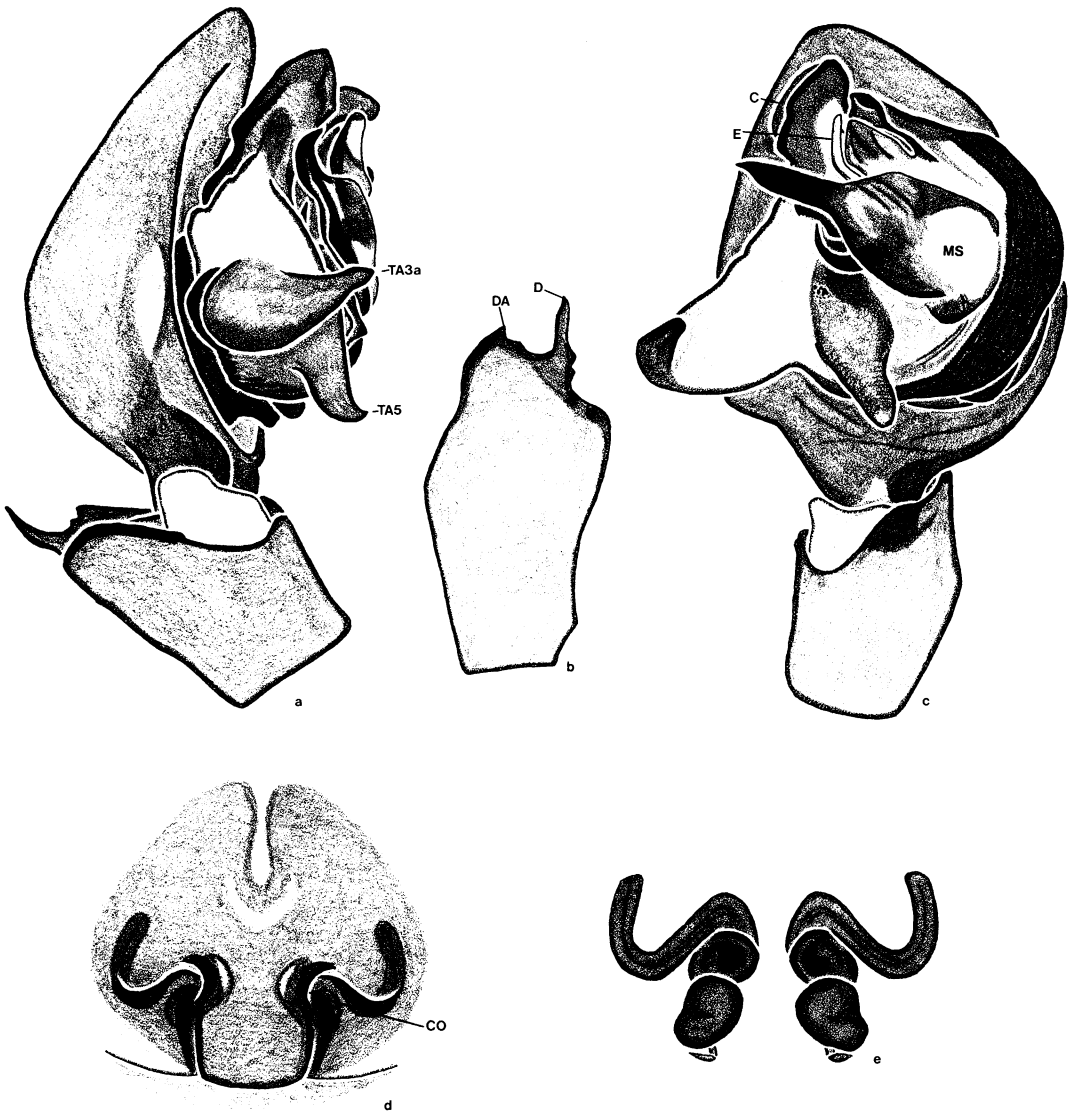

Fig. 18. *Matundua silvatica* (Purcell), Diepwalle. a–c. Right male palpus. d, e. female. **a.** Tibia and tarsus, retrolateral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, ventral. **d.** Epigynum. **e.** Spermathecae. TA3a, TA5 = tegular processes; E = embolus; C = conductor; MS = median sclerite; CO = copulatory opening; DA = anterodorsal tibial lobe; D = dorsal tibial process.

translucent, EBS with bipartite apical portion, EBA1 and EBA2 lobate, with large, abruptly tapering median sclerite (MS) which hides embolic base, basal portion of this with median hooked process (fig. 18c); tegulum (fig. 18a) with large, apically bent retrolateral process (TA3a) and basomedian, proximad-directed process (TA5); with thickened, apical cup-shaped, sclerotized conductor (C) lacking apical fringe.

FEMALE (paralectotype): Total length 13.38. Carapace orange-brown, dark sclerotized radii extending from thoracic fovea on pars thoracica and along pars cephalica margin, pars cephalica shading to red-brown anteriorly; black pigment surrounding each eye;

chelicerae dark red-brown, boss orange-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, unmarked, tibiae-tarsi of palpus and leg I and femur and metatarsus-tarsus of leg II orange-brown; abdomen gray-brown, markings as in male, venter light gray between longitudinal bands. Carapace 6.72 long, 4.63 wide, margin weakly sinuate; thoracic fovea length 0.22 carapace; clypeus 0.59 high; ocular area 0.56 long, 1.86 wide, PER weakly procurved; ratio of eyes AM:AL:PM:PL, 1.00:1.17:1.08:1.25, diameter of PM 0.21; AM separated by ¾ their diameter, separated from AL by 1⅓ AM; PM separated from each other and from PL by twice their diameter; lateral eyes separated by ⅓ PL. Chelicerae 2.72 long, robust, geniculate, with wide, shallow ventrolateral wrinkles; promargin of fang furrow with 5, retromargin with 4 large teeth and 1 minute tooth. Sternum 3.44 long, 2.47 wide, as in male; labium 1.25 long, 0.97 wide; palpal coxa 2.13 long, 1.00 wide. Femur I length 1.46 times carapace width. Spination: palpus: femur d0-0-1-1, patella d0-0-1, tibia p1-0-0-1, tarsus p2-2-1, v0-2-0-4-2, r1-0-1; leg I: femur d0-1-0-0, p0-0-1-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-0-1-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p0-1-0-2, v2-0-1-2, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-1-0, r0-0-0-1, tibia p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v1-1-2-1, r1-0-1-2. Palpal femur with row of 3 stout anterobasal thorns. Calamistrum origin at 0.41 from metatarsus base, length 0.29 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	6.75	4.50	4.94	5.94	2.63
Patella	2.56	2.25	2.13	2.31	1.13
Tibia	5.81	5.50	3.69	5.44	1.44
Metatarsus	6.00	4.56	4.06	5.38	–
Tarsus	2.63	2.19	1.88	2.13	2.38
Total	23.75	19.00	16.70	21.20	7.58

Epigynum as in fig. 18d, epigynal plate arched anteriorly, with shallow anteromedian longitudinal groove, copulatory openings (CO) at anterolateral margins of PML, and lateral transverse external grooves; spermathecae (fig. 18e) simple, bilobate, with hollow lateral bar on each side.

VARIATION: Total length 10.88–15.00; carapace length 1.45–1.51 times width; thoracic fovea length 0.19–0.22 carapace; PER width 1.14–1.23 times AER, 2.83–3.31 times OAL; OQP 1.36–1.52 times OQA, 1.17–1.43 times OQL; cheliceral length 4.42–5.77 times clypeal height, retromargin of fang furrow with 4–5 teeth; apex of sternum blunt to a right angle; labium length 1.24–1.29 times width; femur I length 1.46–1.67 times carapace width.

NATURAL HISTORY: I have collected *Matundua silvatica* beneath logs in moist forest at Diepwalle Forest Station where these are the commonest cribellate spiders (fig. 1c). A female was collected in January with an egg sac beneath a log. Forty-six young subsequently hatched from the egg sac. A subadult male collected at the same time subsequently molted to maturity in captivity.

DISTRIBUTION: Cool temperate forest in the southern Cape Province, South Africa (fig. 103).

MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Knysna, Mar. 1896, indigenous forest (W. F. Purcell, SAM), 3♀ (*Auximus silvaticus* Purcell, syntypes), Oct. 30, 1949 (B. Malkin, CAS), 3♀; Diepwalle Forest Station, 22 km NE Knysna, Jan. 10–13, 1985, elev. 1800 ft, indigenous forest (C. E. Griswold & T. Meikle-Griswold, NMSA), 1♂ (molted), 2♀, Nov. 11–13, 1985 (C. E. Griswold, T. Meikle-Griswold & J. T. Doyen, NMSA), 12♀.

VIDOLE LEHTINEN

Vidole Lehtinen, 1967: 274, 330 (type species by original designation *Auximus capensis* Pocock, lectotype female in BMNH, designated below, examined). – Brignoli, 1983: 528.

DIAGNOSIS: Male palpal bulb with well-developed retroapical cup-shaped conductor (C) (fig. 19b); embolus long, slender, slightly twisted, largely hidden by basal embolic sclerite (EBS), EBS divided into apical EBA and ventromedian EBM (fig. 19b); epigynal plate with anteromedian depressed atrium, with transverse, recurved ridge across anterior margin of atrium (figs. 19e, 26a–c); spermathecae (figs. 12b, 24c, d) with hollow an-

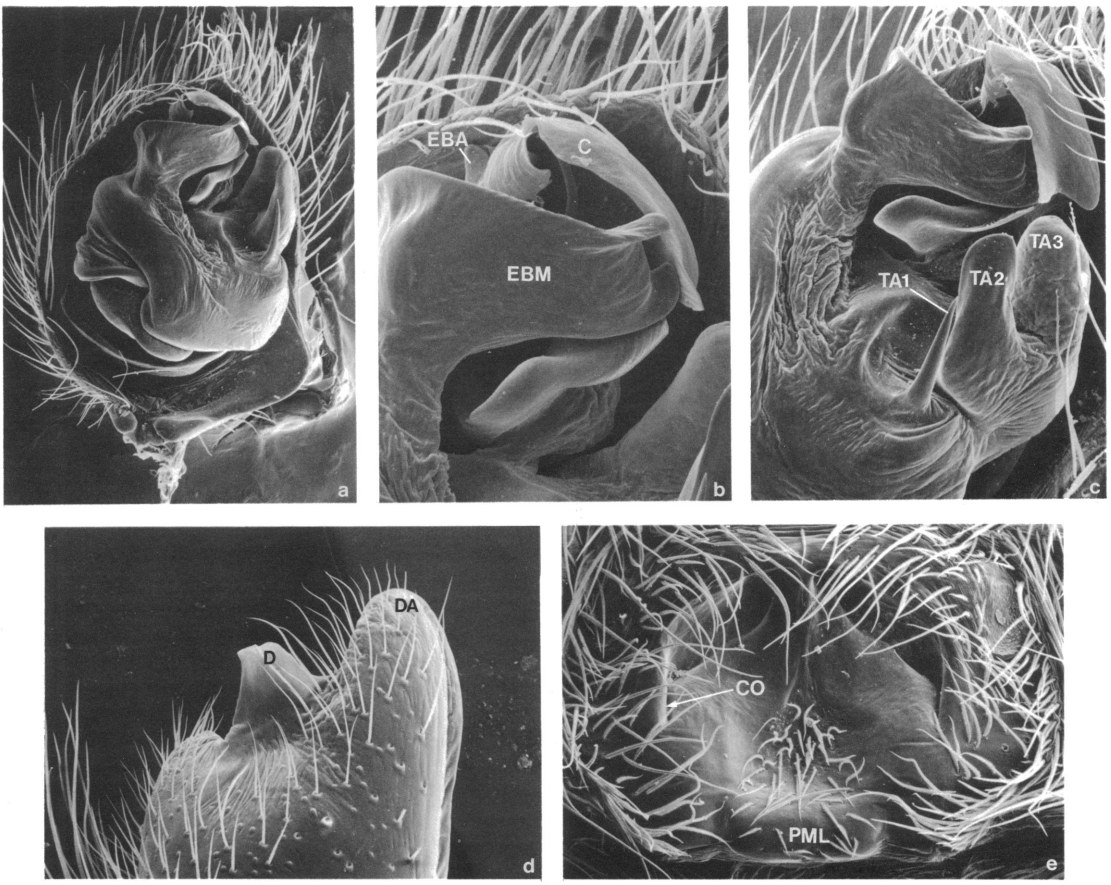

Fig. 19. *Vidole capensis* (Pocock), Buffels Bay. **a–c.** Male palpal bulb, ventral. **d.** Male palpal tibia, dorsal. **e.** Epigynum. EBA = apical division of basal embolic sclerite; EBM = median division of basal embolic sclerite; C = conductor; TA1, TA2, TA3 = tegular processes; D = dorsal tibial process; DA = anterodorsal tibial lobe; CO = copulatory opening; PML = posterior median lobe of epigynum.

terior spermathecal ducts (ASD) extending anteriorly along interior wall of epigynal atrium.

DESCRIPTION: Total length 5.25 to 14.5 mm. Body densely setose (fig. 1a). Carapace (fig. 17a) length 1.32–1.59 times width; fovea long, deep, narrowed posteriorly, length 0.12–0.27 times carapace length; AER slightly recurved, PER straight, OA width 2.50–4.43 times length; clypeal height 1.83–5.21 times AM diameter; cheliceral length 4.10–7.36 times clypeal height, male chelicerae with weak ventrolateral wrinkles, female chelicerae smooth to weakly wrinkled, promargin of fang furrow with 5–6 teeth, retromargin with 5–8 teeth. Sternum (fig. 17b) long, length 1.21–1.50 times width, narrowed anteriorly, sides angled to sinuate, apex blunt to a right angle; labium length 0.97–1.65 times width. Legs (fig. 1a) long, generally unmodified, uniformly marked, leg formula 1423; femur I 1.15–1.72 times carapace width, male metatarsus I straight (fig. 22c, d) to sinuate (fig. 22a, b); metatarsi III, IV, and usually II with apical pro- and retrolateral preening combs, venters of tarsi densely setose; origin of calamistrum at 0.31–0.40 from base of metatarsus IV, calamistrum 0.28–0.50 metatarsus length, may have weakly developed pseudocalamistrum. Abdominal dorsum with markings variable, venter with paired narrow longitudinal bands (fig. 17b). Palpal femur with straight row of 3–4 anterobasal enlarged thorns (fig. 5e, f), slender to stout. Male palpal tibia with dorsal

(fig. 19d) process consisting of produced retroapical DA and lobate or rectangular hyaline process (D); cymbium cup-shaped, apex blunt; embolic base probasal (fig. 23a) to prolateral (fig. 21a), embolus long, slender, slightly twisted, hidden for most of length by EBS, apex cradled by cup-shaped conductor (C) arising from retroapex of tegulum (fig. 19b); retrodorsal surface of conductor with transverse ridge (CTR), EBS large, complex, embracing embolus, forked into apical EBA and ventral EBM (fig. 19b); tegulum with a maximum of four processes including TA1, TA2, TA3, and TA4 (fig. 19c), with TA1 and TA4 present or absent. Epigynum (fig. 19e) with copulatory openings located just anteriad of anterolateral margins of posterior median lobe (PML); epigynal plate with anteromedian depressed atrium, with transverse, recurved ridge across anterior margin of atrium (figs. 24a, b, 26a–c); each spermatheca (fig. 12b) with simple single or double internal chamber or spiral internal chamber, with hollow anterior spermathecal duct (ASD) (fig. 24c) extending anteriorly along interior wall of epigynal atrium; fertilization ducts posterior.

COMPOSITION: Five species. Relationships among the species are depicted on the cladogram in figure 20.

DISTRIBUTION: South Africa (fig. 104).

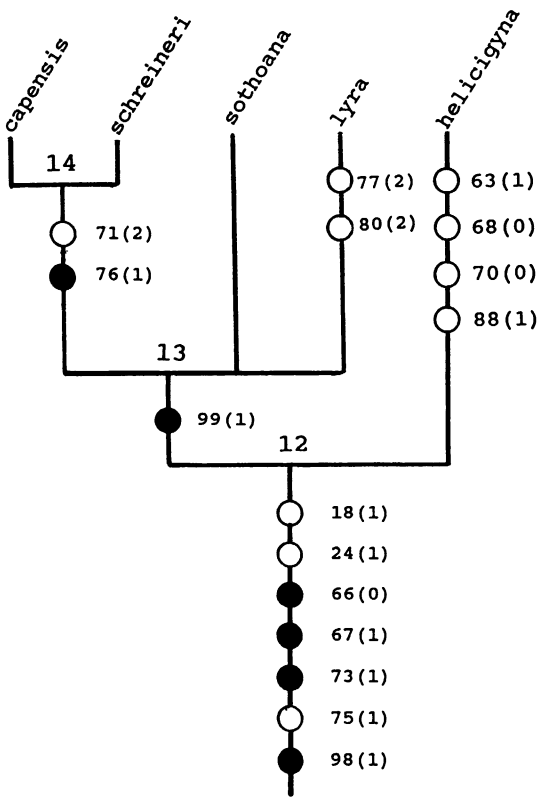

Fig. 20. Cladogram for the species of *Vidole* (shaded circles: unique synapomorphies; open circles: homoplasy).

Vidole sothoana, new species

Figures 21a–c, 22c, d, 24b, d, 104

TYPES: Holotype male and paratype female from Kroondal, Rustenberg District, Transvaal, South Africa (Aug. 7, 1978; O. Wehnholdt), deposited in NCP.

ETYMOLOGY: The specific name is in honor of the Basotho people occupying the high interior plateau of South Africa and Lesotho.

DIAGNOSIS: Male palpal bulb as in figure 21a, c, TA2 broad in retrolateral view and shorter than TA3, TA1 absent, EBM subquadrate, palpal tibia with D process a small lobe (fig. 21b); epigynum (fig. 24b) with atrium equal in width to PML, spermatheca a simple spherical chamber, ASD stout, converging, simple (fig. 24d).

MALE (holotype): Total length 8.88. Carapace yellow-brown, pars thoracica with long anteromedian, median, and posteromedian sclerotized radii, pars cephalica shading to red-brown anteriorly, darkest laterally; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, and trochanters pale yellow-brown; legs and palpi yellow-brown, becoming darker distally, metatarsus-tarsus I orange-brown; abdomen gray-brown, dorsum with anterior light cardiac mark and faint median chevrons, venter with pair of narrow, broken light longitudinal bands, between these several pairs of light spots. Carapace 4.25 long, 3.09 wide, margin weakly sinuate; thoracic fovea long, deep, 0.17 carapace length; clypeus 0.34 high; ocular area 0.38 long, 1.04 wide; ratio of eyes AM:AL:PM:PL, 1.17:1.33:1.00:1.08, diameter of PM 0.12; AM separated by ⅔ their diameter, separated from AL by ⅘ AM; PM

separated by 1½ their diameter, separated from PL by 1⅘ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 2.08 long, slender, with anterior, lateral and ventrolateral transverse fine wrinkles, promargin of fang furrow with 6 teeth, retromargin with 4 large teeth and 1 minute tooth. Sternum 2.25 long, 1.66 wide; labium 0.84 long, 0.59 wide; palpal coxa 1.25 long, 0.63 wide. Femur I length 1.33 times carapace width; metatarsus I (fig. 22c, d) nearly straight, tapering distally. Spination: palpus: femur d0-0-1; leg I: femur d0-0-1-0, p0-0-1-1, tibia p1-1-0-2, v2-2-0-2, r1-1-0-2, metatarsus p0-1-0-1, v2-2-0-1, r0-1-0-1; leg II: femur d1-0-1-0, p0-0-0-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-0-1-0, p0-1-0-1, r0-1-0-1, patella p0-0-1, tibia d1-0-1-0, p0-1-1-0, v2-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-1-2; leg IV: femur d1-1-0-0, p0-0-0-1, tibia p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-2, v2-0-2-1, r1-0-1-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.13	3.31	3.00	3.88	1.50
Patella	1.69	1.38	1.31	1.50	0.75
Tibia	3.69	2.69	2.19	3.38	0.50
Metatarsus	3.94	3.06	2.75	3.63	—
Tarsus	1.81	1.56	1.31	1.63	1.25
Total	15.26	12.00	10.56	14.02	4.00

Palpal femur with row of 3 enlarged slender anterobasal thorns; tibia (fig. 21b) with D process a small, narrow lobe; palpal bulb as in figure 21a, c, embolic origin promedian, TA2 broad, subquadrate in retrolateral view, widely separated from and shorter than TA3, TA1 absent, EBM subquadrate, apex of EBA blunt, bilobed, CTR a long, narrow shelf.

VARIATION: Total length 7.19–9.69; carapace length 1.37–1.45 times width; thoracic fovea 0.17–0.24 length carapace, may be narrowed posteriorly; PER width 1.16–1.21 times AER, 2.68–2.71 times OAL; OQP 1.19–1.24 times OQA, 1.07–1.17 times OQL; cheliceral length 5.73–6.57 times clypeal height, may have strong lateral striae, retromargin of fang furrow with 5–6 teeth; sternum length 1.36–1.41 times width; labium length 1.23–1.46 times width; palpal femur with row of 2–4 enlarged anterobasal thorns.

FEMALE (paratype): Total length 9.06. Markings as in male except darker; dorsum of abdomen uniform. Carapace 4.00 long, 2.63 wide; thoracic fovea narrowed posteriorly, length 0.19 carapace; chelicerae 0.34 high; ocular area 0.38 long, 1.10 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.40:1.07:1.27, diameter of PM 0.13; AM separated by ½ their diameter, separated from AL by 1⅛ AM; PM separated by 1h1 their diameter, separated from PL by twice PM diameter; lateral eyes separated by ⅓ PL diameter. Chelicerae 1.81 long, robust, smooth, promargin of fang furrow with 5, retromargin with 4 large and 3 minute teeth. Sternum 2.16 long, 1.50 wide; labium 0.75 long, 0.63 wide; palpal coxa 1.25 long, 0.69 wide. Femur I length 1.31 times carapace width. Spination: palpus: femur d0-1-1, patella d1-0-1, p0-1-0, tibia p0-1-1-0, tarsus p2-2-1, v1-2-2-3-2, r1-1-0; leg I: femur d0-0-1-0, p0-0-1-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-0-1, r0-1-0-1; leg II: femur d0-0-1-0, p0-0-0-1, tibia p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-2-2, r0-0-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-0-0-2. Palpal femur with row of 3 enlarged anterobasal thorns. Calamistrum origin at 0.37 from metatarsus base, length 0.29 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.44	2.81	2.50	3.25	1.38
Patella	1.44	1.31	1.13	1.31	0.63
Tibia	2.88	2.06	1.81	2.81	0.81
Metatarsus	2.75	2.19	2.00	2.69	—
Tarsus	1.50	1.31	1.19	1.38	1.38
Total	12.01	9.68	8.63	11.44	4.20

Epigynum (fig. 24b) with atrium equal in width to PML, paired pockets hidden beneath anterior lip; spermatheca a simple spherical chamber, ASD stout, converging, simple (fig. 24d).

VARIATION: Total length 7.13–13.13; carapace length 1.47–1.59 times width, pars cephalica may have faint prefoveal v-shaped mark; thoracic fovea 0.15–0.21 length carapace; PER width times 1.19–1.22 AER, 2.50–4.43 times OAL; OQP 1.30–1.38 times OQA, 1.10–1.57 times OQL; cheliceral length 5.38–

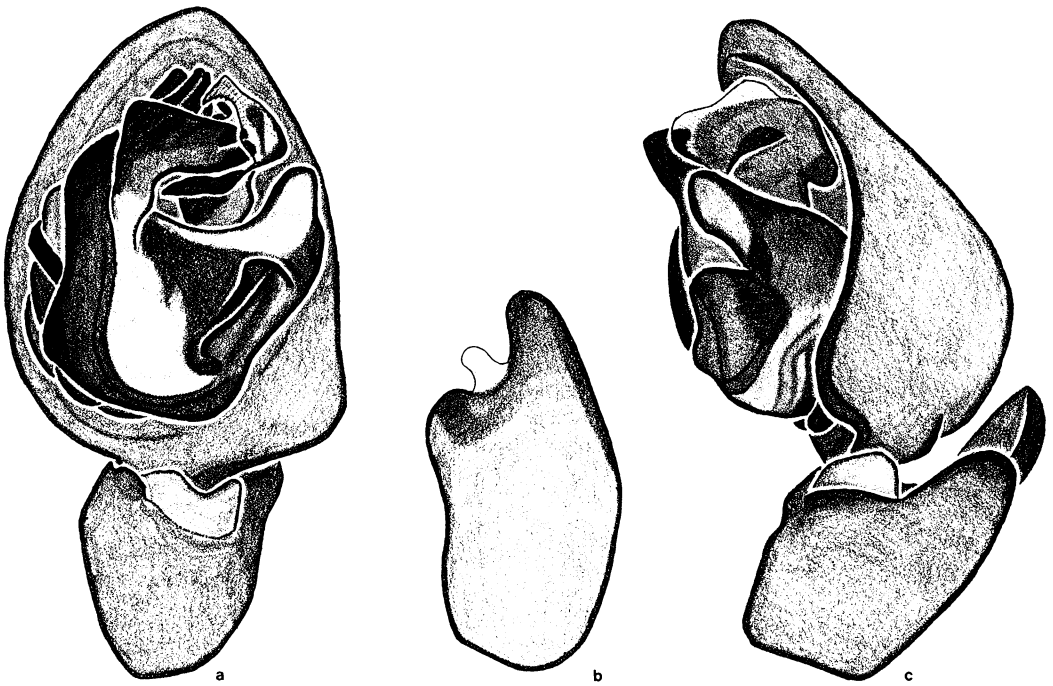

Fig. 21. *Vidole sothoana*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

6.29 times clypeal height, promargin of fang furrow with 5 or 6, retromargin with 5–8 teeth; sternum length 1.31–1.44 times width, apex blunt to a right angle; labium length 1.13–1.22 times width; femur I length 1.15–1.31 times carapace width; palpal femur with row of 3 or 4 enlarged anterobasal thorns.

NATURAL HISTORY: Label data suggest that this species occurs in open vegetation, including grasslands and cultivated fields.

DISTRIBUTION: Highveld regions of Lesotho and South Africa (fig. 104).

ADDITIONAL MATERIAL EXAMINED: LESOTHO: Maseru (G. Vannier, MRAC), 1♀. SOUTH AFRICA: *Cape Province*: Vryberg, Sept. 1918 (J. Brown, SAM), 5♂, 7♀; Bothaville, Britstown, June 1920 (A. Roberts, TMP), 1♂. *Orange Free State*: Smithfield (Kannemeyer, SAM), 1♂; Edenville, April 24, 1969, pitfall traps (J. Viljoen, NCP), 1♀; Waterval, Parys, May 22, 1977 (D. Uys, NCP), 2♀. *Transvaal*: Skeerpoort, Strauss Farm, Sept. 9, 1979 (A. Le Roy, NMSA), 2♀; 4.8 km S of Louis Trichardt, June 28, 1972, elev. 1158 m (E. S. Ross, CAS), 1♀; Johannesburg, Sept. 1905 (W. F. Purcell, SAM), 1♂; Venterskroon, Potchefstroom, Mar. 28, 1917 (G. Van Dam, TMP), 1♀; Rust de Winter, Feb. 10, 1983, pitfall traps in cotton (M. Stiller, NCP), 1♀; Modderfontein, Oct. 1986 (N. O'Donnell, NCP), 1♀; Pretoria, June 1923 (V. Wager, TMP), 1♂, Apr. 13, 1977, in glasshouse (M. Venter, NCP), 1♀, Wonderboom Nature Reserve, June 5, 1977 (D. Seekings, NCP), 1♂, 2♀, Irene Estate, Mar. 3, 1972 (C. K. Brain, TMP), 1♀; Melville Kopjes, near Johannesburg, 6000 ft elev., Apr. 9, 1976 (F. Wanless & A. Russell Smith, BMNH), 2♀; Carltonville Cave, 13 km SW Carltonville, Feb. 18, 1978, dark zone (D. &. M. Davis, B. Akerbergs, NMNH), 2♀; Dwaalboom, Rustenburg, June 2, 1978 (D. Uys, NCP), 2♀; Rietondal (25°43′S: 28°13′E), June 21, 1988, pitfall (C. Barnard, NCP), 2♂; Kloofendal, Nov. 9, 1986, woodland, under flat stone in leaf litter (A. le Roy, NCP) 1♀.

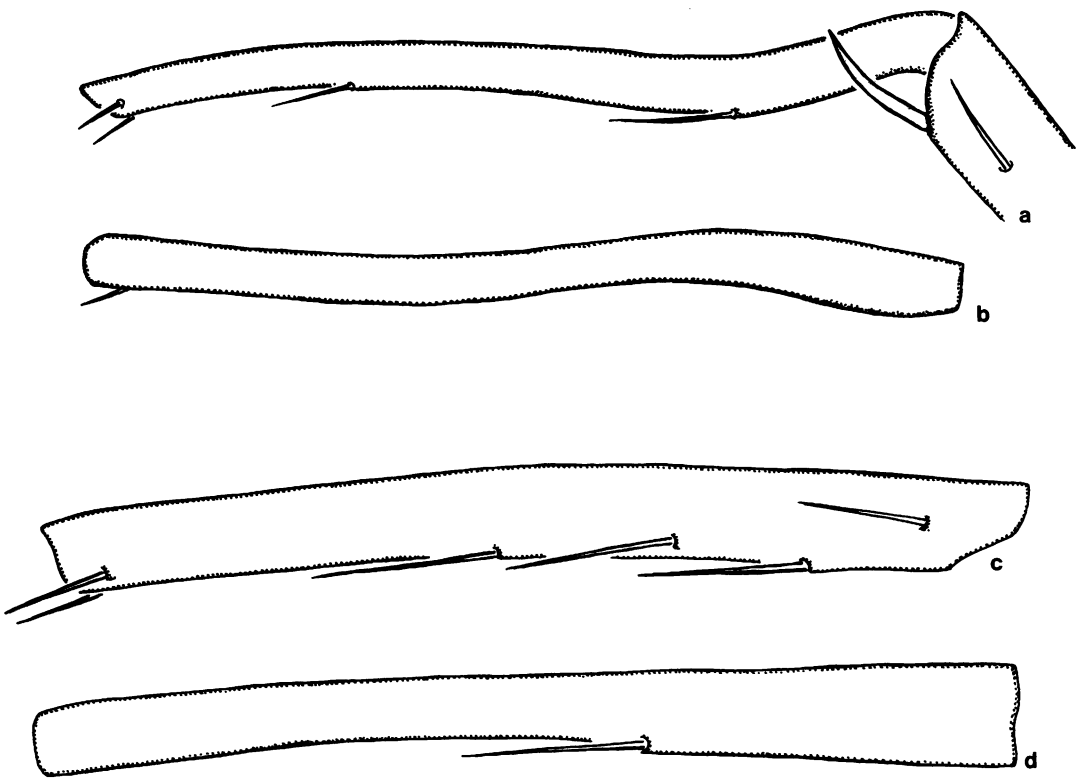

Fig. 22. *Vidole* spp., male right leg I. a, b. *helicigyna*, new species, holotype. c, d. *sothoana*, new species, holotype. **a.** Tibia and metatarsus, prolateral. b–d. Metatarsi. **b, d.** Dorsal. **c.** Prolateral.

Vidole helicigyna, new species
Figures 22a, b, 23a–c, 26a, d, 104

TYPE: Holotype male from Otto's Bluff, near Pietermaritzburg, Natal, South Africa (Dec. 1936; R. F. Lawrence), deposited in NMSA, type no. 446.

ETYMOLOGY: The specific name is from the Greek *helix*, referring to the coiled spermathecae.

DIAGNOSIS: Leg I (fig. 22a, b) of male with enlarged, curved apical proventral tibial spine and metatarsus dorsoventrally sinuate near base; palpal bulb (fig. 23a, c) with embolic origin probasal, embolus exposed along entire prolateral margin of bulb, TA2 a narrow, rounded lobe, close to and longer than TA3, EBM broad, semicircular, apex of EBA proapically pointed; palpal tibia (fig. 23b) with D process a semicircular lobe, DA elongate, apex acute; epigynal atrium (fig. 26a) broader than PML, anterior lip of atrium without hidden paired pockets, ASD end before anterior atrial margin; spermatheca with an internal spiral (fig. 26d).

MALE (holotype): Total length 5.31. Specimen faded, carapace yellow-white, faint sclerotized anteromedian, median, and posteromedian radii on pars thoracica and along margin of pars cephalica; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown; sternum, labium, coxae, trochanters, legs, and palpi yellow-white, unmarked; metatarsus I orange-brown; abdomen gray, dorsum with anterior longitudinal median light band, venter pale yellow-brown. Carapace 2.84 long, 2.16 wide, margin entire; thoracic fovea long, deep, narrowed posteriorly, length 0.27 carapace; clypeus 0.22 high; ocular area 0.26 long, 0.74 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.30:1.10:1.40, diameter of PM 0.09; AM separated by ⅜ their diameter, separated from AL by ⅘ AM; PM

separated by 1⅔ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.17 long, slender, concave at sides, with fine lateral striae, promargin of fang furrow with 6, retromargin with 4 large and 2 minute teeth. Sternum 1.53 long, 1.13 wide, margin nearly entire, apex a right angle; labium 0.50 long, 0.41 wide; palpal coxa 0.78 long, 0.44 wide. Femur I length 1.16 times carapace width; tibia I with apical proventral enlarged, curved spine; metatarsus I dorsoventrally sinuate near base (fig. 22a, b). Spination: palpus: femur d0-0-1; leg I: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v2-0-0-2, r0-1-1-0, metatarsus p0-0-0-1, v2-0-2-2, r0-0-0-1; leg II: femur d1-1-0-0, p0-0-0-1, tibia p0-1-1-0, v2-2-0-2, r0, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p1-0-0-0, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v2-1-0-2, r0-0-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v2-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1-1, r1-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	2.50	2.25	2.00	2.50	1.13
Patella	1.06	0.94	0.88	1.00	0.44
Tibia	2.50	2.25	2.00	2.50	0.44
Metatarsus	2.88	1.94	1.75	2.56	—
Tarsus	1.38	0.94	0.88	1.00	1.25
Total	10.32	8.32	7.51	9.56	3.26

Palpal femur with row of 3 short, stout anterobasal thorns; tibia (fig. 23b) with D process a semicircular lobe, DA elongate, apex acute; bulb (fig. 23a, c) with embolic origin probasal, embolus exposed along entire prolateral margin of bulb, TA2 a narrow, rounded lobe, close to and longer than TA3, TA1 absent, EBM broad, semicircular, apex of EBA proapically pointed, CTR a short, pronounced lobe.

VARIATION: Total length 5.31–6.63; carapace length 1.32–1.43 times width; thoracic fovea 0.21–0.27 length carapace; PER width 1.17–1.24 times AER, 2.74–2.88 times OAL; OQP 1.31–1.38 times OQA, 1.11–1.25 times OQL; cheliceral length 5.21–5.80 times clypeal height; sternum length 1.31–1.36 times width; labium length 1.17–1.23 times width; femur I length 1.16–1.42 times carapace width; palpal femur with row of 3–5 enlarged anterobasal thorns.

FEMALE (Howick): Total length 5.63. Markings essentially as in male; chelicerae orange-brown, boss yellow-brown; abdomen gray-brown, dorsum unmarked, venter with pair of faint, broken light longitudinal bands. Carapace 2.81 long, 1.87 wide; thoracic fovea 0.17 carapace length; clypeus 0.21 high; ocular area 0.26 long, 0.80 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.64:1.18:1.45, diameter of PM 0.10; AM separated by ¾ their diameter, separated from AL by AM diameter; PM separated by 1½ times their diameter, separated from PL by 1½ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.31 long, robust, smooth, promargin of fang furrow with 5 teeth, retromargin with 4 or 5 large teeth and 1 minute tooth. Sternum 1.44 long, 1.19 wide, margin sinuate, apex a right angle; labium 0.47 long, 0.42 wide; palpal coxa 0.81 long, 0.50 wide. Femur I length 1.20 times carapace width. Spination: palpus: femur d0-0-1, patella d1-0-1, p1-1-0, tibia p0-1-2-0, tarsus p3-2-1, v1-1-2-2-3-1, r1-0-0; leg I: femur d0-0-1-0, p0-0-1-1, tibia p0-1-1-0, v0-0-2, metatarsus p0-1-0-1, v2-2-1, r0-0-1-1; leg II: femur d1-1-0-0, p0-0-0-1, tibia p0-1-1-0, v0-1-2, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-1-1, r1-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-2, v2-2-1, r1-0-0-2. Palpal femur with 4 small anterobasal thorns. Calamistrum origin at 0.39 from metatarsus base, length 0.46 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.25	1.88	1.63	2.19	1.00
Patella	1.00	0.88	0.84	0.94	0.47
Tibia	1.81	1.38	1.13	1.81	0.63
Metatarsus	2.00	1.44	1.25	1.75	—
Tarsus	1.13	0.88	0.75	0.88	1.06
Total	8.19	6.46	5.60	7.57	3.16

Epigynum (fig. 26a) with atrium broader than PML, anterior lip of atrium without hidden paired pockets, ASD visible ventrally ending before anterior atrial margin; spermathecal capsule elongate with an internal spiral of 7–8 turns (fig. 26d).

VARIATION: Total length 5.63–6.06; carapace length 1.36–1.50 times width; PER width

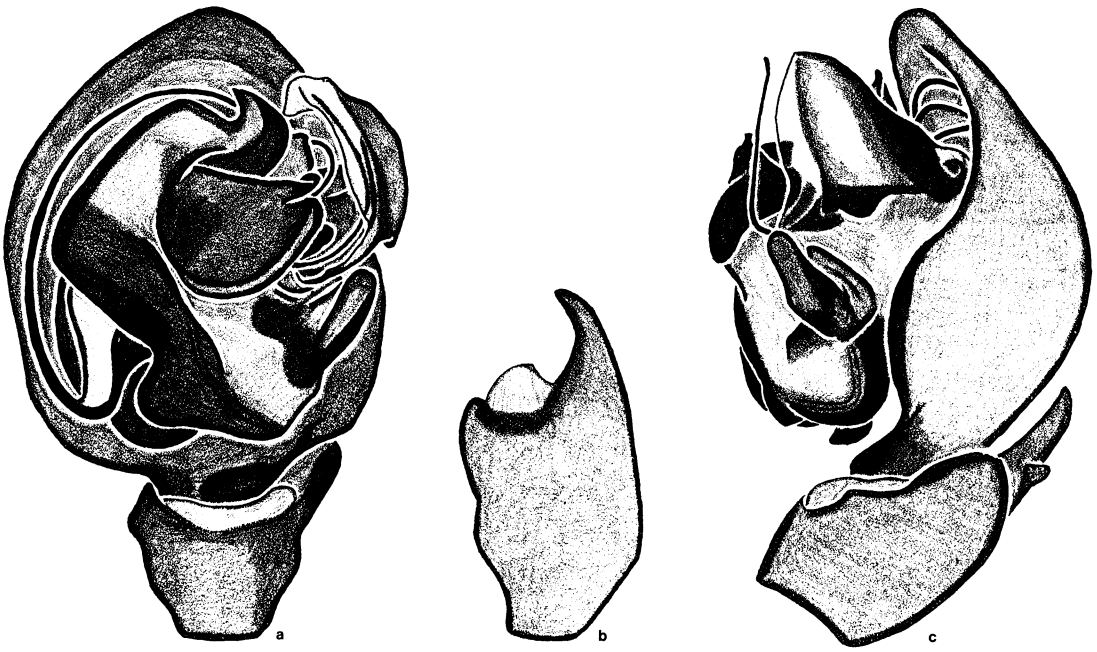

Fig. 23. *Vidole helicigyna*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

1.00–1.12 times AER, 2.74–3.13 times OAL; OQP 1.38–1.47 times OQA, 1.19–1.38 times OQL; cheliceral length 6.31–7.36 times clypeal height, smooth or finely wrinkled, pro- and retromargins of fang furrow with 5 or 6 teeth; sternum length 1.21–1.33 times width; labium length 0.97–1.11 times width; palpal femur with row of 3 or 4 stout anterobasal thorns.

DISTRIBUTION: Natal Midlands, South Africa (fig. 104).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Natal*: Howick, Sept. 1905 (W. F. Purcell, SAM), 1♂, 6♀.

Vidole lyra, new species
Figures 24a, c, 104

TYPE: Holotype female from Transkei coast, Lusikisiki Dist., Mzimhlava River mouth, Cape Province, South Africa, in coastal evergreen forest (Feb. 1980; M. Baddeley), deposited in MRAC.

ETYMOLOGY: The specific name is from the Greek *lyra*, or "lyre," referring to the form of the spermathecae.

DIAGNOSIS: Epigynum (fig. 24a) with atrium nearly triangular, broader than PML, with small paired pockets hidden beneath anterior atrial rim; each spermatheca bilobed (fig. 24c), copulatory opening emptying into translucent chamber leading to dorsal bulb, ventral bulb with spherical internal chamber, ASD very slender, curved.

FEMALE (Mzimhlava River mouth): Total length 7.56. Carapace orange-brown, pars thoracica dusky along margin and with short anteromedian, median, and posteromedian radii, pars cephalica dusky along margin, shading to red-brown anteriorly; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown, boss orange-brown; labium and palpal coxa orange-brown, lighter at tips; sternum yellow-brown, with dusky markings; coxae, trochanters, legs and palpi yellow-brown, unmarked except palpal tarsus and metatarsus-tarsus I red-brown; abdomen gray-brown, dorsal markings obscure, venter with pair of narrow broken light longitudinal bands. Carapace 3.25 long, 2.34 wide, margin weakly sinuate; thoracic fovea narrow, length 0.14 carapace; clypeus 0.24 high; ocular area 0.40 long, 1.07 wide; ratio

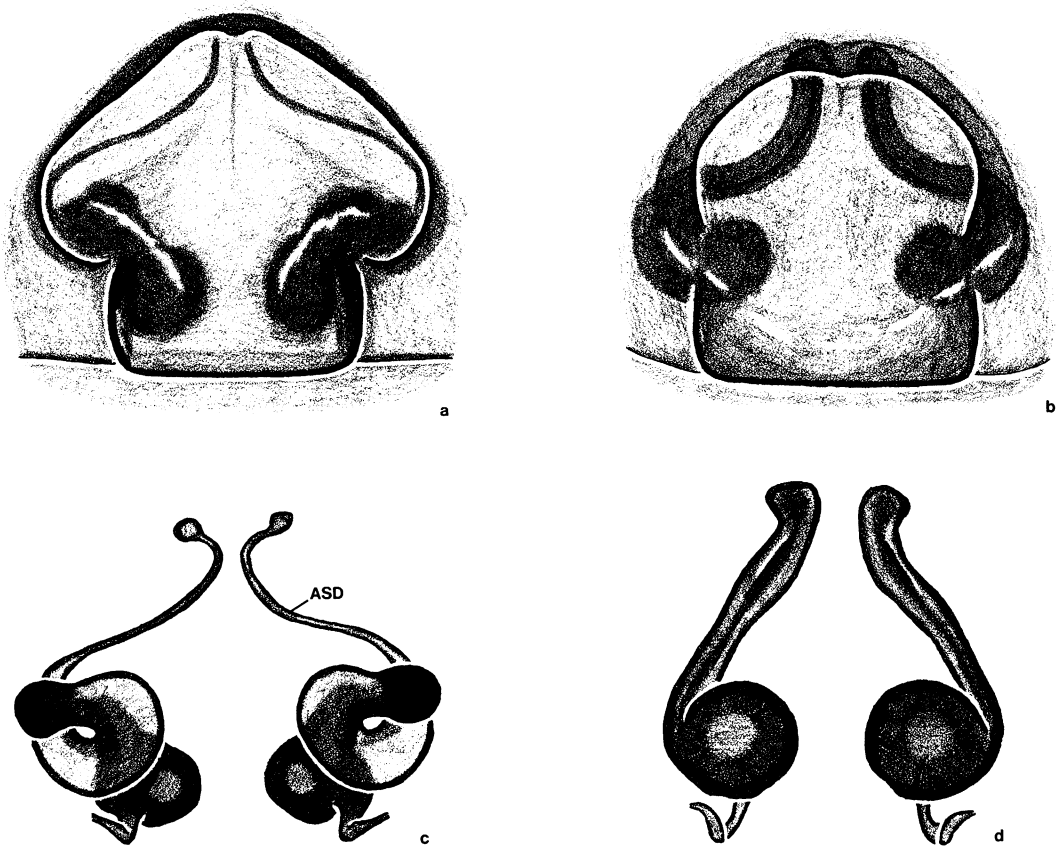

Fig. 24. *Vidole* spp., female genitalia. a, c. *lyra*, new species, paratype. b, d. *sothoana*, new species. b. Paratype. d. Pretoria. **a, b.** Epigyna, ventral. **c, d.** Spermathecae, dorsal. ASD = anterior spermathecal duct.

of eyes AM:AL:PM:PL, 1.00:1.22:1.00:1.11, diameter of PM 0.14; AM separated by ⅔ their diameter, separated from AL by nearly AM diameter; PM separated by 1⅘ times their diameter, separated from PL by 1½ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 1.52 long, geniculate, smooth, promargin of fang furrow with 5, retromargin with 5 large and 2 minute teeth. Sternum 1.72 long, 1.38 wide, apex weakly prolonged; labium 0.59 long, 0.55 wide; palpal coxa 0.94 long, 0.56 wide. Femur I length 1.44 times carapace width. Spination: palpus: femur d0-0-1-1, patella p1-1, tibia p1-2, tarsus p2-1-1, v0-0, r1-0-0; leg I: femur d0-1-0-0, p0-0-1-1-1, r0-0-0-1, tibia p0-1-1-0, v1-2-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-0-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v1-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-0-2, r0-0-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-0-1-2, v2-1-0-1, r1-0-0-2. Palpal femur with 3 small anterobasal thorns. Calamistrum origin at 0.36 from metatarsus base, length 0.40 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.38	2.63	2.31	3.00	1.25
Patella	1.25	1.06	1.00	1.19	0.56
Tibia	3.06	1.94	1.56	2.50	0.69
Metatarsus	3.00	2.00	1.81	2.44	—
Tarsus	1.38	1.06	0.94	1.06	1.13
Total	12.07	8.69	7.62	10.19	3.57

Epigynum (fig. 24a) with atrium nearly tri-

angular, broader than PML, with small paired pockets hidden beneath anterior atrial rim, spermathecae bilobed (fig. 24c), each with copulatory opening emptying into translucent chamber leading to dorsal bulb, ventral bulb with spherical internal chamber, ASD very slender, curved.

VARIATION: Total length 5.38–8.81; carapace length 1.39–1.53 times width; thoracic fovea 0.12–0.15 length carapace, may be narrowed posteriorly; PER width 1.10–1.14 times AER, 2.50–2.77 times OAL; OQP 1.19–1.43 times OQA, 1.14–1.27 times OQL; cheliceral length 5.30–6.82 times clypeal height, retromargin of fang furrow with 6 or 7 teeth; labium length 1.00–1.11 times width.

NATURAL HISTORY: All label data suggest that this species is restricted to coastal forests.

DISTRIBUTION: Known only from the type locality on the Transkei Coast, South Africa (fig. 104).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Transkei coast, Lusikisiki Dist., Mzimhlava River mouth, coastal evergreen forest, Jan. 1980, 2♀, Feb. 1980, 6♀ (M. Baddeley, MRAC).

Vidole capensis (Pocock)

Figures 1a, 3a, 5e, f, 12b, 15d, 17a, b, 19a–e, 25a–c, 26b, e, 104

Auximus capensis Pocock, 1900: 323 (female lectotype and 2 female paralectotypes, here designated, Table Mountain, South Africa, BMNH, examined). – Roewer, 1954: 1361. – Bonnet, 1955: 823.

Vidole capensis: Lehtinen, 1967: 274.

Amaurobius promontorii Simon, 1906: 294 (6 female syntypes from Cape Town, South Africa, MNHN, examined). – Roewer, 1954: 1358. – Bonnet, 1955: 292. First synonymized by Lehtinen, 1967: 274.

Haemilla profundissima Lawrence, 1964: 60 (female holotype from Bredasdorp District, South Africa, SAM, examined). NEW SYNONYMY

Phyxelida profundissima: Brignoli, 1983: 528.

NOTE: Pocock (1900) based this species on specimens collected at Table Mountain by J. Hull and at Cape Town and Port Elizabeth by H. A. Spencer. Among the BMNH material which I have examined I have been able to positively identify as syntypes only those Table Mountain specimens collected by Hull. Lectotype and paralectotype designations are accordingly made for those specimens.

DIAGNOSIS: Male palpal bulb (figs. 19a–c, 25a, c) with acutely pointed TA1, TA2 and TA3 widely separated, about equal in length, apex of TA3 rounded, EBA blunt, squared off in ventral view; epigynal atrium no wider than PML (figs. 19e, 26b), with paired pockets beneath anterior rim, each spermatheca a simple chamber, ASD curved, tapering, converging toward apex, with subapical dorsal-directed lobe (figs. 12b, 26e).

MALE (Buffels Bay): Total length 7.63. Carapace pale yellow-brown, pars thoracica with faint anteromedian, median, and posteromedian sclerotized radii, pars cephalica darkened anteriad of thoracic fovea, shading to brown anteriorly; ocular area dusky, black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown; labium and palpal coxa yellow-brown, lighter at tips; sternum, coxae, and trochanters yellow-white, sternum with posterior median dusky longitudinal band; legs and palpi yellow-white, shading to yellow-brown from tibiae distally, unmarked, cymbium orange-brown; abdomen gray-brown, markings of dorsum obscure, with anterior and median pairs of faint light spots and short median longitudinal light band, venter with pair of narrow, entire longitudinal light bands, area between these pale. Carapace 3.75 long, 2.75 wide, margin weakly sinuate; thoracic fovea long, deep, narrowed posteriorly, 0.21 length carapace; clypeus 0.27 high; ocular area 0.22 long, 0.96 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.40:1.20:1.33, diameter of PM 0.14; AM separated by ½ their diameter, separated from AL by nearly AM diameter; PM separated by their diameter, separated from PL by 1¼ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.60 long, slender, with fine anterior, lateral and ventrolateral wrinkles, promargin of fang furrow with 5, retromargin with 5 large and 2 minute teeth. Sternum 2.19 long, 1.56 wide, margin sinuate; labium 0.72 long, 0.55 wide; palpal coxa 1.16 long, 0.59 wide. Femur I length 1.50 times carapace width. Spination: leg I: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, r0-1-0-1, tibia d0-0-1-0, p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-0-1, r0-1-0-1, patella

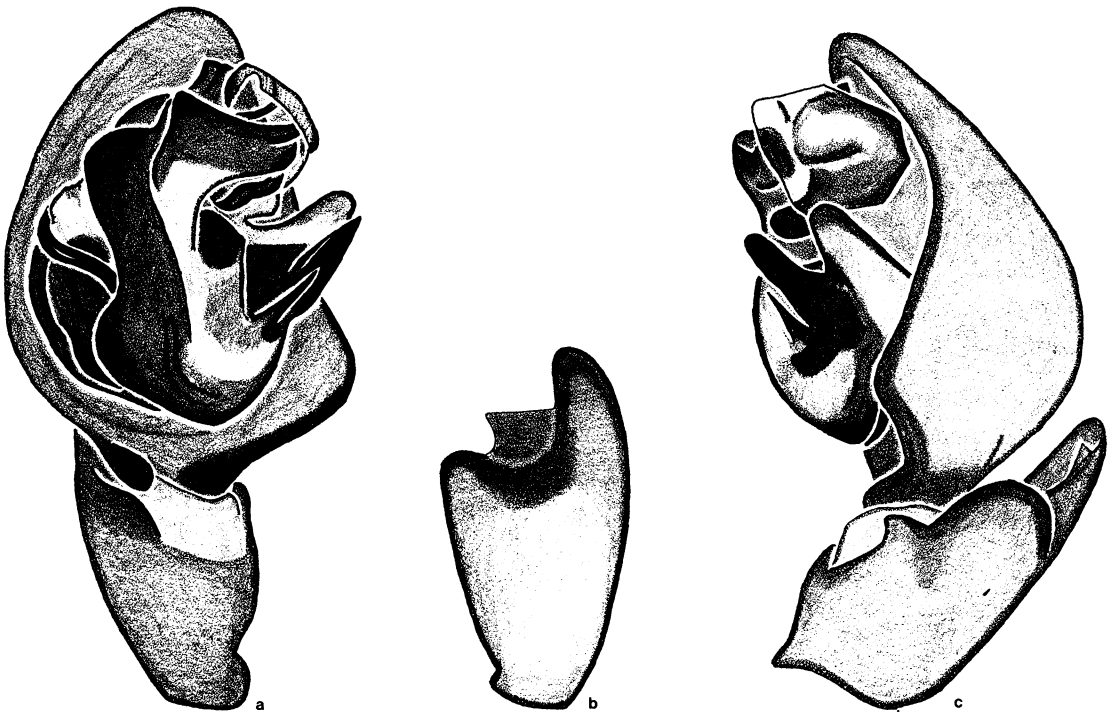

Fig. 25. *Vidole capensis* (Pocock), Buffels Bay, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

d0-0-1, tibia d1-1-0-1, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-1-2, v2-2-1, r1-0-1-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.13	3.25	3.00	4.06	1.63
Patella	1.50	1.31	1.19	1.44	0.69
Tibia	3.63	2.62	2.19	3.44	0.69
Metatarsus	3.75	2.88	2.63	3.75	—
Tarsus	1.69	1.31	1.25	1.56	1.31
Total	14.70	11.37	10.26	14.25	4.32

Palpal femur with row of 3 anterobasal thorns; tibia (fig. 25b) with DA short, blunt, D process trapezoidal with retrolateral angle; bulb (figs. 19a–c, 25a, c) with embolic origin promedian, embolus largely hidden, TA1 present, acutely pointed, TA2 and TA3 widely separated, about equal in length, apex of TA3 rounded, EBM subquadrate, EBA blunt, squared off in ventral view, CTR a long, narrow shelf.

VARIATION: Total length 7.63–9.00; carapace length 1.36–1.39 times width, markings distinct to obscure, faint prefoveal v-shaped mark present or absent; thoracic fovea 0.21–0.25 length carapace; PER width 1.15–1.20 times AER, 2.68–4.29 times OAL; OQP 1.27–1.37 times OQA, 1.15–1.86 times OQL; cheliceral length 4.60–5.88 times clypeal height; sternum length 1.31–1.49 times width; labium length 1.21–1.38 times width; femur I length 1.50–1.71 times carapace width; abdominal markings distinct to obscure.

FEMALE (Signal Hill): Total length 11.13. Markings essentially as in male, except darker; black pigment extending between AM and between lateral eyes; chelicerae dark red-brown, boss yellow-brown; sternum yellow-brown, unmarked; abdomen with obscure dorsal median longitudinal light band, flanked with 4 pairs of light spots and with posterior transverse light mark (fig. 17a, b). Carapace 5.50 long, 3.59 wide; thoracic fovea narrowed posteriorly, 0.20 carapace length; clypeus 0.50 high; ocular area 0.46 long, 1.42 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.33:1.11:1.33, diameter of PM 0.16; AM separated by ¾

their diameter, separated from AL by 1⅓ AM; PM separated by nearly twice their diameter, separated from PL by twice PM diameter; lateral eyes separated by ⅓ PL diameter. Chelicerae 2.24 long, geniculate, nearly smooth, with only weak, broad ventral wrinkles, promargin of fang furrow with 6, retromargin with 6 large and 2 minute teeth. Sternum 2.81 long, 2.00 wide, as in male; labium 1.03 long, 0.81 wide; palpal coxa 1.66 long, 0.94 wide. Femur I length 1.22 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-1, p0-1-0, tibia p0-1-0-2, tarsus p2-2-1, v0-2-1-3-2-2, r1-0-1; leg I: femur d1-1-0-0, p0-0-1-1, r0-1-0-0, tibia p0-1-1-0, v0-2-1, r0-1-1-0, metatarsus p0-1-0-1, v2-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-0-1, r0-1-0-1, tibia p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-0-1-2. Palpal femur with row of 3 enlarged stout anterobasal thorns (fig. 5e, f). Calamistrum origin at 0.35 from metatarsus base, length 0.33 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.38	3.63	3.31	4.38	1.88
Patella	2.00	1.75	1.63	1.88	0.88
Tibia	3.75	2.69	2.31	3.50	1.06
Metatarsus	3.56	2.75	2.56	3.44	–
Tarsus	1.63	1.50	1.38	1.63	1.75
Total	15.32	12.32	11.19	14.83	5.57

Epigynum (fig. 26b) with atrium no wider than PML, with paired pockets beneath anterior rim; each spermatheca a simple spherical chamber, ASD curved, tapering, converging toward apex, with subapical dorsal-directed lobe (fig. 26e).

VARIATION: Total length 10.00–14.25; carapace length 1.43–1.53 times width, markings distinct to obscure; thoracic fovea length 0.17–0.22 carapace; PER width 1.15–1.22 times AER, 2.66–3.67 times OAL; OQP 1.21–1.40 times OQA, 1.10–1.37 times OQL; cheliceral length 4.10–5.23 times clypeal height, smooth to weakly wrinkled, promargin of fang furrow with 5 or 6, retromargin with 7–9 teeth; sternum length 1.33–1.41 times width, apex blunt to pointed; labium length 1.24–1.65 times width; femur I length 1.25–1.51 times carapace width; abdomen with dorsal markings distinct (fig. 17a) to obscure, ventral longitudinal light bands entire (fig. 17b), broken, or obscure.

NATURAL HISTORY: These are the commonest cribellate spiders along the southern and western coasts of Cape Province, South Africa, and may be locally abundant. *Vidole capensis* occurs in a wide variety of habitats. I have collected them beneath rocks and logs in fynbos vegetation near Cape Town, and found them to be abundant beneath bark and in holes (fig. 1a) and crevices on tree trunks in White Milkwood (*Sideroxylon inerme* Linneus) thickets along the coasts of the Cape of Good Hope and Cape Agulhas. Interestingly, I did not find this species in the wet forests on Table Mountain or at Diepwalle (where other Phyxelidinae, *Malaika longipes* and *Matundua silvatica*, respectively, were common), suggesting that this is not primarily a species of high forests. Label data suggest that they are also found in caves and in relatively dry fynbos and fynbos-karroo habitats.

DISTRIBUTION: Coastal regions and winter rainfall areas of Cape Province, Ciskei, and Transkei, South Africa (fig. 104).

MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Cape Town, (MNHN), 6♀ (*Amaurobius promontorii* Simon syntypes), 1890 (BMNH), 1♀, 3♀, (P. L. Sclater, BMNH), 4♀; Cape Town, South African Museum grounds, Dec. 26, 1916 (R. W. Tucker, SAM), 2♀, Aug. 21, 1922 (White, SAM), 1♀; Table Mountain, (J. Hull, BMNH), 3♀ (syntypes of *Auximus capensis* Pocock), Aug. 28, 1915, woods (R. W. Tucker, SAM), 1♀, woods near Platteklip, Apr. 11, 1915 (R. W. Tucker, SAM), 1♀; Signal Hill, Cape Town, Oct. 27, 1985, elev. 1100 ft (C. E. Griswold, T. Meikle-Griswold, & J. T. Doyen, NMSA), 1♂, 1♀; Lion's Head, near Cape Town, Oct. 27, 1985 (molted), elev. 1300 ft (C. E. Griswold, NMSA), 1♂; Cape Flats, Sept. 1904 (L. Schultze, ZMB), 2♀; Mowbray, Sept. 1, 1970 (J. M. Sauzier, NMSA), 1♂; Simonstown, June 19, 1903 (ZMB), 1♀, Miller's Point, July 23, 1903, under stones (ZMB), 1♂; Cape Peninsula, Feb. 1965 (NMSA), 1♀; Hout Bay Mts., Nov. 1916 (R. W. Tucker, SAM), 1♂; 5 km SE Scarborough, Jan. 2, 1985 (molted), under

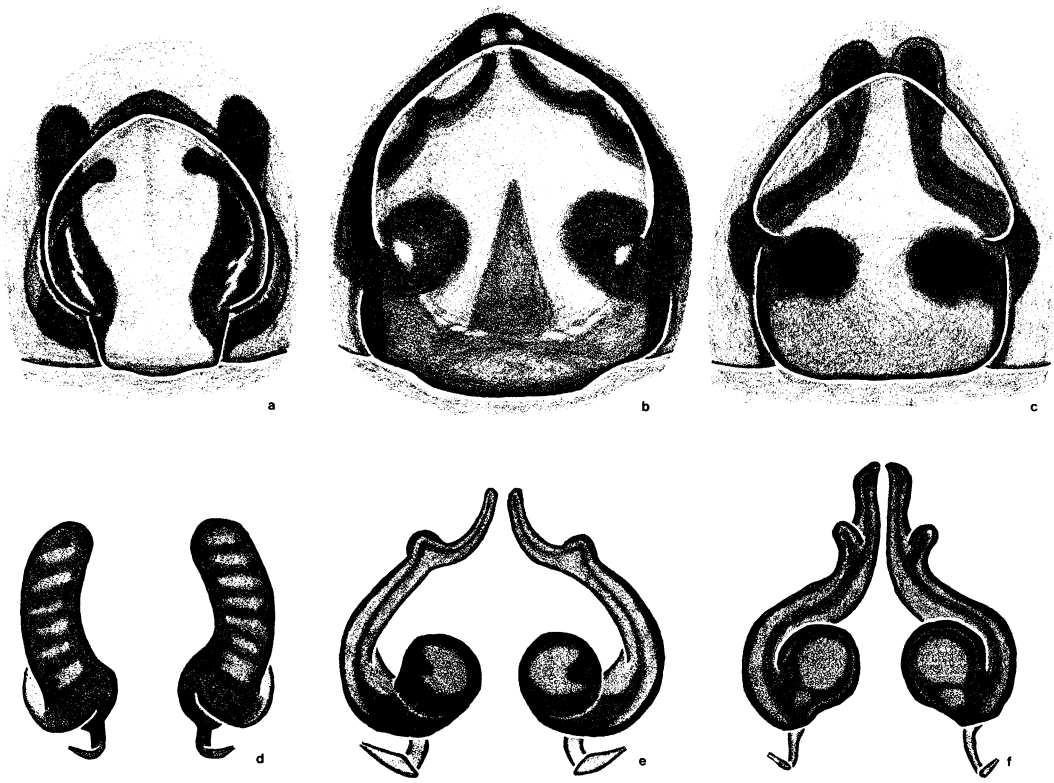

Fig. 26. *Vidole* spp., female genitalia. a, d. *helicigyna*, new species, Howick. b, e. *capensis* (Pocock). b. Signal Hill. e. Cape Town. c, f. *schreineri* (Purcell). c. Paralectotype. f. Willowmore. **a-c.** Epigyna, ventral. **d-f.** Spermathecae, dorsal.

rocks in fynbos (C. E. Griswold, NMSA), 4♂, 1♀, Jan. 5, 1985, fynbos (C. E. Griswold & T. Meikle-Griswold, NMSA), 1♂, 1♀; Cape Peninsula, Observatory, Aug. 20, 1981, in house (C. A. Car, SAM), 1♀; Buffels Bay, Cape of Good Hope, Oct. 25–29, 1985, in trees in white milkwood thicket (C. E. Griswold, T. Meikle-Griswold, & J. T. Doyen, NMSA), 7♂, 14♀; Cape Point, Apr. 26, 1958 (E. S. Ross & R. E. Leech, CAS), 1♀; Dassen Island (A. White, SAM), 3♀, (E. L. Gill, SAM), 1♀; Dyers Island, Jan. 12, 1926 (AMNH), 4♂, 6♀; Queenstown (G. T. Wells, BMNH), 1♂; Caledon, July 1910 (W. F. Purcell, SAM), 8♀; Montagu, Oct. 1919, 1♀, Nov. 1919, (R. W. Tucker, SAM), 3♀, Sept. 1917 (E. P. Philip, SAM), 2♀; 19 mi SE Garies, May 2, 1958, elev. 220 m (E. S. Ross & R. Leech, CAS), 1♀; 6 mi SW Ceres, Jan. 8, 1967, elev. 290 m (E. S. Ross & K. Lorenzen, CAS), 1♀; 40 km E Ceres, foothills of Hex River Mts., Sept. 20, 1981 (C. A. Car, SAM), 1♀; St. Helena Bay, 1905 (SAM), 2♂, 2♀; Saldanha Bay, Sept. 18, 1949 (B. Malkin, CAS), 1♀; Paternoster, Sept. 19, 1949 (B. Malkin, CAS), 2♀; Swellendam, June 1983 (J. Visser, SAM), 1♀; Onmeetbarediepgat, Bredasdorp, July 1961 (C. Gow, SAM), 1♀ (*Haemilla profundissima* Lawrence, holotype); Waenhuiskrans (Arniston), Nov. 10–11, 1985 (C. E. Griswold & T. Meikle-Griswold, NMSA), 2♂, 4♀; Knysna, Oct. 30, 1949 (B. Malkin, CAS), 2♀; Tsitsikama National Park, near Knysna, Aug. 30, 1980, forest close to coast (P. Sierwald, NMNH), 1♀; Plettenberg Bay, Apr. 23, 1958, elev. 20 m (E. S. Ross & R. E. Leech, CAS), 1♀; Coldstream, Humansdorp, Jan. 1921 (R. W. Tucker, SAM), 3♀; Port Elizabeth, (R. Broom, BMNH), 1♀; Sundays River mouth, N of Port Elizabeth, Jan. 10, 1981 (NMSA), 1♀; Skoenmakerskop, near Port Elizabeth, Feb. 6, 1965 (B. G. Donnelly, NMSA), 1♀;

Alexandra Forest, 46 km SSW Grahamstown, Oct. 21, 1978, in hole in tree trunk (P. M. C. Croeser, NCP), 1♀; Grahamstown, (Scheunland, BMNH) 1♂, Jan. 1, 1980, in riverine bush (P. M. C. Croeser, NCP), 1♀, Dec. 7, 1979 (P. M. C. Croeser, NMSA), 1♀, Tea Forest (M. Lippar, BMNH), 1♀; Addo Bush, July 1919 (J. Drury, SAM), 1♀; East London, Sept. 29, 1905 (W. F. Purcell, SAM), 1♂, 1♀, Apr. 1977 (D. P. Keech, NCP), 1♀; Transkei coast, Nxaxo River mouth, Jan. 1962 (R. F. Lawrence, NMSA), 1♂; 1 mi E Engcobo, Apr. 14, 1958, elev. 1000 m (E. S. Ross & R. E. Leech, CAS), 2♀; Stutterheim, Jan. 1911 (C. French, SAM), 1♂, 1♀.

Vidole schreineri (Purcell)

Figures 26c, f, 27a–c, 104

Auximus schreineri Purcell, 1904: 131 (male lectotype and 2 male and 4 female paralectotypes, here designated, from Hanover, South Africa, SAM, examined). – Roewer, 1954: 1361. – Bonnet, 1955: 825.

Vidole capensis: Lehtinen, 1967: 274 (in part) (misidentification, not *capensis* Pocock, 1900).

NOTE: The specific distinctness of *V. schreineri* and *V. capensis* is clear (see diagnoses), therefore the synonymy proposed by Lehtinen (1967: 274) is rejected.

DIAGNOSIS: Male palpal bulb (fig. 27a, c) with acutely pointed TA1, TA2, and TA3 approximate, apex of TA3 pointed, apex of EBA acute; epigynal atrium no wider than PML (fig. 26c), with paired pockets beneath anterior rim, spermatheca a simple chamber, ASD stout, parallel for distal one-third, with subapical dorsal-directed lobe (fig. 26f).

MALE (lectotype): Total length 8.50. Entire specimen faded, markings obscure; carapace yellow-brown, shading to red-brown anteriorly; chelicerae red-brown, boss yellow-brown; labium and palpal coxa yellow-brown, lighter at tips; sternum, labium, coxae, trochanters, legs and palpi yellow-white, unmarked, metatarsi I and II orange-brown; abdomen pale gray. Carapace 4.50 long, 3.22 wide; thoracic fovea long, narrow, length 0.22 carapace; clypeus 0.34 high; ocular area 0.45 long, 1.17 wide; ratio of eyes AM:AL:PM:PL, 1.13:1.38:1.00:1.38, diameter of PM 0.13; AM separated by nearly ½ their diameter, separated from AL by ¾ AM; PM separated by 1¾ their diameter, separated from PL by 2⅓ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 2.02 long, elongate, with ventrolateral wrinkles, promargin of fang furrow with 5, retromargin with 4 large and 2 minute teeth. Sternum 2.63 long, 1.75 wide, margin sinuate; labium 0.91 long, 0.63 wide; palpal coxa 1.41 long, 0.69 wide. Femur I length 1.53 times carapace width; metatarsus I slender, slightly sinuate. Spination: palpus: femur d0-0-0-1; leg I: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-1-0-1-1, r0-1-0-0, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-1-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-0-1-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.94	4.19	3.81	4.94	1.88
Patella	1.75	1.56	1.56	1.75	0.63
Tibia	4.63	3.44	2.94	4.56	0.69
Metatarsus	5.13	3.94	3.56	4.94	–
Tarsus	2.00	1.69	1.50	1.81	1.44
Total	18.45	14.82	13.37	18.00	4.64

Palpal femur with row of 3 stout enlarged anterobasal thorns; tibia (fig. 27b) with DA short, D process trapezoidal with retrolateral angle; bulb (fig. 27a, c) with embolic origin promedian, embolus hidden, TA1 present, acutely pointed, TA2 and TA3 approximate, apex of TA3 pointed, EBM subquadrate, apex of EBA acute, CTR a long, narrow shelf.

FEMALE (paralectotype): Total length 8.13. Specimen faded, markings as in male. Carapace 4.38 long, 2.94 wide; thoracic fovea narrowed posteriorly, length 0.21 carapace; clypeus 0.32 high; ocular area 0.38 long, 1.15 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.24:1.06:1.29, diameter of PM 0.14; AM separated by ½ their diameter, separated from AL by AM diameter; PM separated by 1½ their diameter, separated from PL by twice PM diameter; lateral eyes separated by ⅝ PL diameter. Chelicerae 1.92 long, robust, smooth except for broad, weak, ventral wrinkles, promargin of fang furrow with 5, retromargin with 5 large and 2 minute teeth. Sternum 2.19 long, 1.56 wide, as in male; labium 0.72 long, 0.55 wide; palpal coxa 1.16 long, 0.59 wide.

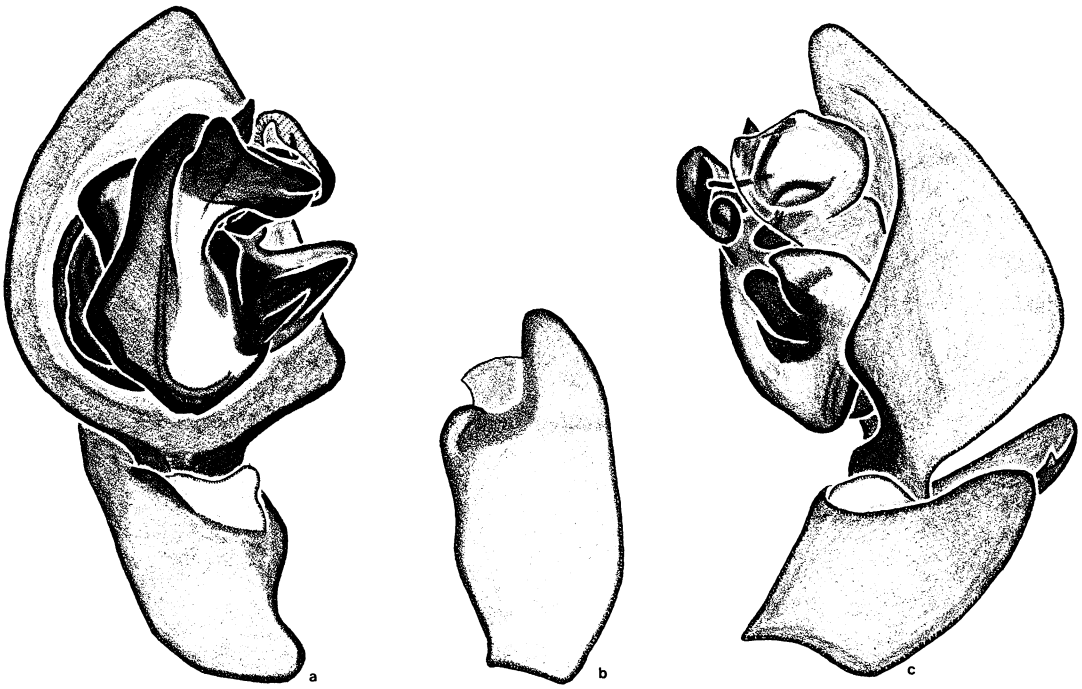

Fig. 27. *Vidole schreineri* (Purcell) (lectotype of *Auximus schreineri* Purcell), male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

Femur I length 1.34 times carapace width. Spination: palpus: femur d0-1-1, patella d1-0-1, p1-1, tibia p2-0-1, tarsus p1-2-1, v0-2-2-2-3-2-1, r0-2-1; leg I: femur d1-0-1-1, p0-0-1-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-1, r1-0-1-2. Palpal femur with row of 3 stout enlarged anterobasal thorns. Calamistrum origin at 0.38 from metatarsus base, length 0.30 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.94	3.13	2.88	3.81	1.50
Patella	1.63	1.44	1.25	1.56	0.63
Tibia	3.25	2.25	2.00	3.19	0.81
Metatarsus	3.13	2.44	2.25	3.13	—
Tarsus	1.44	1.31	1.19	1.31	1.38
Total	13.39	10.57	9.57	13.00	4.32

Epigynum (fig. 26c) with atrium no wider than PML, with paired pockets beneath anterior rim; spermathecae (fig. 26f) simple spherical chambers, ASD stout, parallel and often approximate for distal one-third, with subapical dorsal-directed lobes.

VARIATION: Total length 8.13–10.63; carapace length 1.43–1.49 times width; PER width 1.20–1.37 times AER, 3.00–3.30 OAL; OQP 1.23–1.33 times OQA, 1.17–1.22 times OQL; femur I length 1.27–1.34 times carapace width; appears to be vestige of ventral longitudinal light bands on abdomen.

NATURAL HISTORY: This is a species of dry regions, with label data suggesting that it occurs in arid Karroo and Little Karroo vegetation.

DISTRIBUTION: Southern Karroo region, Cape Province, South Africa (fig. 104).

MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Hanover, Oct. 1901 (S. C. Cronwright Schreiner, SAM 9460), 1♂, 4♀ (*Auximus schreineri* Purcell, syntypes), March–June 1902 (S. C. Cronwright Schreiner, SAM 11876), 2♂ (*Auximus schreineri*

Purcell, syntypes); Willowmore, 1903 (H. Brauns, SAM), 2♀; Midlands, Victoria West, Aug. 1983 (J. Visser, SAM), 1♀; Jansenville (Miss Leppan, BMNH), 2♀.

PONGOLANIA, NEW GENUS

TYPE SPECIES: *Pongolania pongola*, new species.

ETYMOLOGY: The generic name is derived from the type locality of the type species, and is feminine in gender.

DIAGNOSIS: Epigynum with paired, anterior blind, ending pockets (AO) (fig. 28a, b); metatarsi II–IV with apical preening combs.

DESCRIPTION: Small spiders, total length 4 to 6 mm. Carapace length 1.59–1.65 times width; fovea long, narrowed posteriorly, deep, length 0.16–0.17 carapace length; AER slightly recurved, PER straight, OA width 1.81–3.38 times length; clypeal height 2.20–2.67 times AM diameter; cheliceral length 6.08–6.72 times clypeal height, chelicerae smooth, promargin of fang furrow with 5 or 6, retromargin with 4–6 teeth. Sternum long, length 1.24–1.26 times width, margin angled to sinuate, base narrowed, apex a right angle; labium length 1.00–1.07 times width. Legs unmodified, leg formula 1423, femur I 1.37–1.38 times carapace width; metatarsi II–IV with apical combs; pseudocalamistrum absent. Palpal femur with row of 2 or 3 stout anterobasal thorns. Epigynum (fig. 28a, b) with posterior median lobe (PML) short, copulatory openings removed from anterior margin of PML, oblique to longitudinal, with anterior pair of blind, ending pockets with anterior and median rims; copulatory openings communicate with hollow internal bar on each side, spermatheca (fig. 28c, d) with ventral chamber and dorsal bulb; anterior blind, ending pockets with translucent internal sacs; fertilization ducts posterior. Male unknown.

COMPOSITION: Two species.

DISTRIBUTION: Southern Transvaal Province, South Africa (fig. 103).

Pongolania pongola, new species
Figures 12c, 28a, c, 103

TYPE: Holotype female from 15 mi W Pongola, Transvaal, South Africa, elevation 550 m (Apr. 3, 1958, E. S. Ross & R. E. Leech), deposited in CAS.

ETYMOLOGY: The specific name is a noun in apposition after the type locality.

DIAGNOSIS: Epigynum as in figure 28a, copulatory openings oblique, spermathecae as in figure 28c, with ventral chambers spherical.

FEMALE (holotype): Total length 4.56. Carapace yellow-brown, pars thoracica with short anteromedian and median dusky radii, margin dark, pars cephalica shading to orange-brown anteriorly, with broad, dusky, v-shaped mark anteriad of thoracic fovea extending anteriad along margins; black pigment extending between AM and between lateral eyes; chelicerae red-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, unmarked except sternum with median dusky markings, palpal tarsus and metatarsus-tarsus I orange-brown; abdomen gray-brown, dorsum and sides unmarked except for faint anterodorsal light cardiac mark, venter with very thin longitudinal light bands. Carapace 2.69 long, 1.63 wide; thoracic fovea deep, narrowed posteriorly, length 0.17 carapace; clypeus 0.18 high; ocular area 0.43 long, 0.78 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.60:1.20:1.50, diameter of PM 0.10; AM separated by ¾ their diameter, separated from AL by AM diameter; PM separated by 1⅓ their diameter, separated from PL by 1½ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.18 long, smooth, robust, sides straight; promargin of fang furrow with 5, retromargin with 3 large and 2 minute teeth. Sternum 1.28 long, 1.03 wide, weakly narrowed anteriorly, sides entire, apex a right angle; labium 0.47 long, 0.44 wide; palpal coxa 0.84 long, 0.41 wide. Femur I length 1.38 times carapace width. Spination: palpus: femur d0-1-1, patella d1-0-0, p0-1-0, tibia p0-1-1-0, tarsus p2-1-1, v1-0-1-3-2, r0-1-0; leg I: femur d0-1-0-0, p0-0-1-1, tibia v0-0-2-2, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v0-0-2-2, r0-0-1-0, metatarsus p0-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, meta-

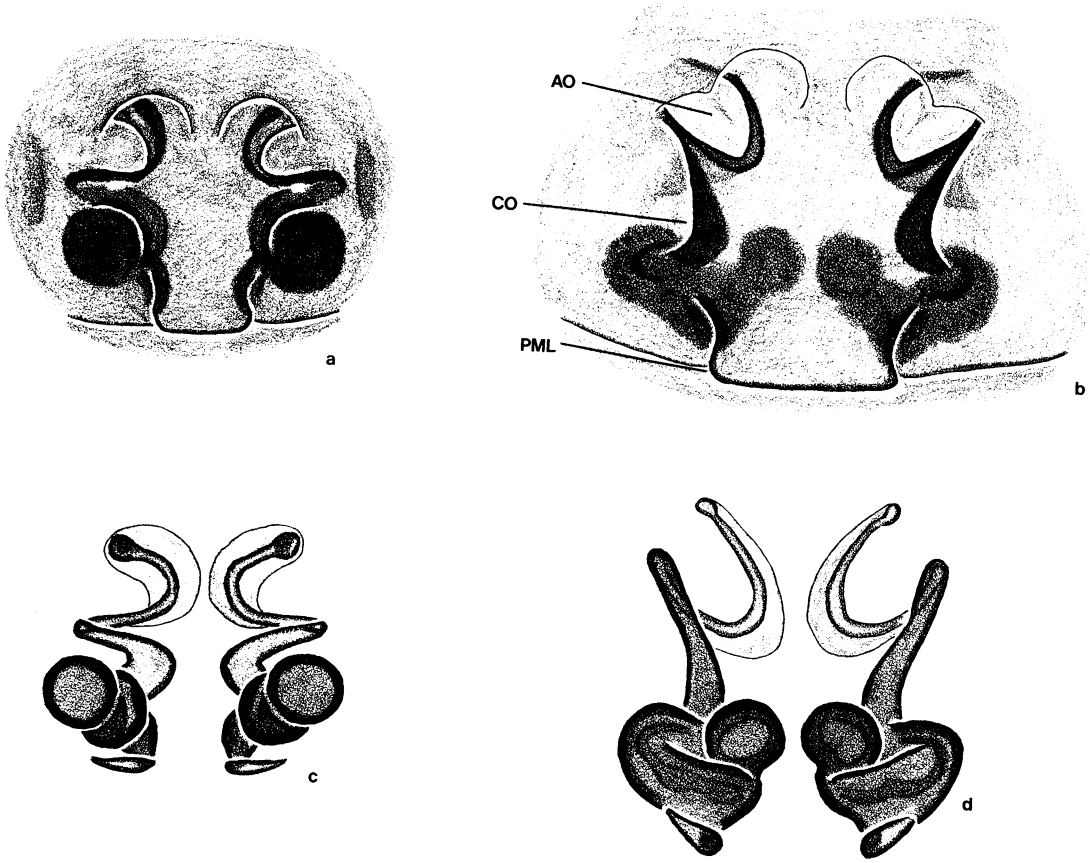

Fig. 28. *Pongolania*, new genus, female genitalia. a, c. *pongola*, new species, holotype. b, d. *chrysionaria*, new species, holotype. **a, b.** Epigyna, ventral. **c, d.** Spermathecae, dorsal. AO = anterior blind-ending pocket; CO = copulatory opening; PML = posterior median lobe of epigynum.

tarsus p1-1-0-2, v2-1-0-1, r1-0-0-2. Palpal femur with row of 2 stout anterobasal thorns. Calamistrum origin at 0.46 from metatarsus base, length 0.39 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	1.13	0.88	0.77	1.06	0.45
Patella	0.47	0.41	0.36	0.41	0.17
Tibia	0.97	0.64	0.56	0.88	0.22
Metatarsus	0.92	0.69	0.63	0.89	—
Tarsus	0.53	0.42	0.38	0.44	0.47
Total	4.02	3.04	2.70	3.68	1.31

Epigynum as in figure 28a, copulatory openings oblique, anterior blind, ending pockets (AO) with outer anterior and inner median semicircular rims; spermathecae as in figure 28c, with ventral chambers spherical, translucent sacs not extending posteriad of apices of copulatory openings.

MALE: Unknown.

DISTRIBUTION: Known only from the type locality (fig. 103).

Pongolania chrysionaria, new species
Figures 28b, d, 103

TYPES: Holotype female from Johannesburg, Transvaal, South Africa, deposited in ZMB; paratypes, 2 females, same data.

ETYMOLOGY: The specific name is from the Greek *chryseion*, a gold mine.

DIAGNOSIS: Epigynum as in figure 28b, copulatory openings longitudinal, spermathecae as in figure 28d, ventral chambers large, trapezoidal.

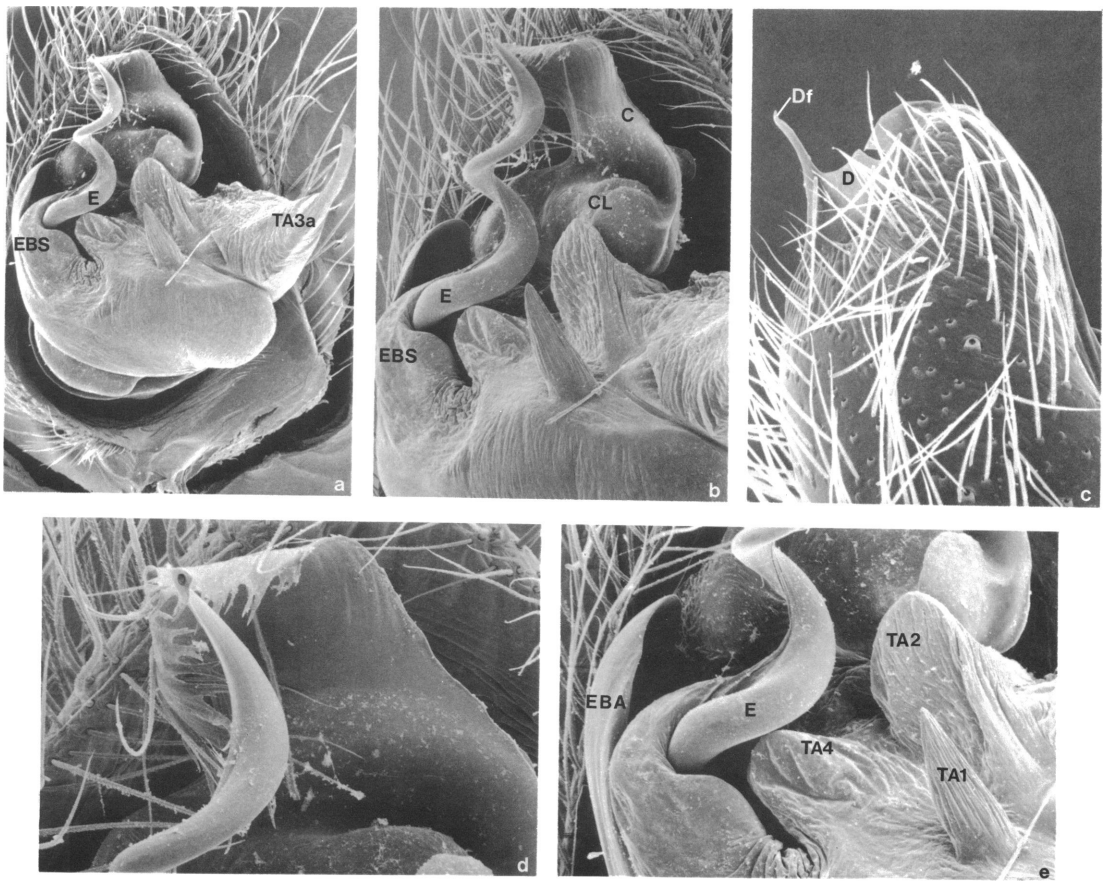

Fig. 29. *Xevioso amica*, new species, False Bay, male palpus. **a, b, d, e.** Bulb, ventral. **c.** Apex of tibia, dorsal. E = embolus; EBS = basal embolic sclerite; EBA = apical lobe of basal embolic sclerite; C = conductor; CL = transverse basoventral lobe of conductor; TA1, TA2, TA3a, TA4 = tegular processes; D = dorsal tibial process; Df = distal flange of hyaline dorsal process.

FEMALE (holotype): Total length 5.63. Carapace yellow-brown, margin of pars thoracica dark, with submarginal dusky reticulations, pars cephalica with short dusky, v-shaped mark anteriad of thoracic fovea, faint reticulations and thin lines extending anteriad to posterior eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark orange-brown, boss yellow-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs and palpi pale yellow-brown, sternum dusky; palpal tarsus red-brown; apical halves of femora I and II, patellae and tibiae dusky, femora with retrolateral, tibiae with prodorsal and retrodorsal longitudinal yellow-brown bands, metatarsi-tarsi I and II orange-brown; abdomen gray-brown, damaged, markings obscure. Carapace 2.53 long, 1.59 wide; thoracic fovea deep, narrowed posteriorly, length 0.16 carapace; clypeus 0.19 high; ocular area 0.21 long, 0.70 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.78:1.11:1.44, diameter of PM 0.08; AM separated by ⅔ their diameter, separated from AL by 1⅓ AM; PM separated by 1⅘ their diameter, separated from PL by twice PM diameter; lateral eyes separated by ¼ PL diameter. Chelicerae 1.17 long, robust, smooth, promargin of fang furrow with 5 or 6, retromargin with 6 or 7 teeth. Sternum 1.34 long, 1.06 wide, apex a right angle; labium 0.47 long, 0.47 wide; palpal coxa 0.88 long, 0.44 wide. Femur I length 1.37 times

carapace width. Spination: palpus: femur d0-0-0-1, patella d0-0-1, tibia p2-0-1, tarsus p2-0-1, v0-0-1-2-3-2, r0-1-1-0; leg I: femur p0-0-1-1, tibia p0-1-0-1, v1-0-2-2, r0-1-0-0, metatarsus v2-1-1-2; leg II: femur d1-1-0-0, p0-0-0-1, tibia p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-0-0, r0-1-0-0, tibia d1-0-1-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d1-0-0-0, p0-0-0-1, tibia p0-1-0-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-1-1, r1-0-0-2. Palpal femur with row of 3 stout anterobasal thorns. Calamistrum origin at 0.38 from metatarsus base, length 0.45 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	1.09	0.88	0.75	1.06	0.47
Patella	0.47	0.41	0.34	0.45	0.20
Tibia	0.88	0.63	0.56	0.91	0.25
Metatarsus	0.91	0.69	0.66	0.91	–
Tarsus	0.56	0.47	0.41	0.44	0.47
Total	3.91	3.08	2.72	3.77	1.39

Epigynum as in figure 28b, copulatory openings longitudinal, anterior pockets with outer, anterior bilobed rim and inner, median oval rim; spermathecae as in figure 28d, ventral chambers large, trapezoidal, translucent sacs of blind, ending pockets extending posteriad of apices of copulatory openings.

MALE: Unknown.

DISTRIBUTION: Known only from the type locality in the highveld of the Transvaal Province, South Africa (fig. 103).

XEVIOSO LEHTINEN

Xevioso Lehtinen, 1967: 275, 330 (type species by original designation *Haemilla tuberculata* Lawrence, male and female syntypes, NMSA, examined). – Brignoli, 1983: 528.

DIAGNOSIS: Palpal femur with longitudinal row of two enlarged, stout anterobasal thorns (fig. 5c, d); male palpal bulb (figs. 10, 29a, b, d, e) with well-developed retroapical cup-shaped, sclerotized conductor, embolus slender, twisted screwlike for ½ to more than two turns; epigynum (figs. 7a, 35a–c) simple, copulatory openings laterad of fertilization ducts and located at anterolateral margin of posterior median lobe (PML), usually without anterior depressions or openings; spermathecae usually with spiraled internal chambers (figs. 12e, 35d–f), rarely simple, spherical (figs. 12d, 38c).

DESCRIPTION: Total length 3.5 to 11 mm. Body densely setose. Carapace length 1.27–1.58 times width; thoracic fovea long, usually deep, narrowed posteriorly, length 0.11–0.25 times carapace length; AER slightly recurved, PER straight, ocular area width 1.33–3.73 times length; clypeal height 1.63–2.67 times AM diameter; cheliceral length 2.48–9.91 times clypeal height, chelicerae in male smooth to striate, may have lateral row of spinules (fig. 7e, f), in female usually smooth, promargin of fang furrow with 3–6 teeth, retromargin with 4–8 teeth (fig. 14b). Sternum long, length 1.09–1.41 times width, sides angled to sinuate, base narrowed, apex blunt to a right angle, not pointed; labium length usually greater than width (0.91–1.47). Legs with formula 1423, markings uniform or with metatarsi-tarsi I and II darkened, femur I length 1.37–1.93 times carapace width; male metatarsus I unmodified (fig. 47c–f) or with median prodorsal process and prolateral concavity (figs. 7b–d, 40a–d); metatarsi III, IV, and usually II with apical pro- and retroventral preening combs (fig. 6e); origin of calamistrum at 0.34–0.43 from base of metatarsus IV, calamistrum 0.29–0.47 metatarsus length; pseudocalamistrum weak to absent. Abdominal dorsum with markings variable, venter with paired longitudinal bands narrow to absent. Palpal femur with single row of 2–4 anterobasal thorns, distal two much stouter (fig. 5c, d). Male palpal tibia (figs. 29c, 37b, 41b) with dorsal process consisting of variously modified retroapical setose DA and median, smooth (D) which is usually hyaline and may be broad, produced, or reduced; the median portion of the hyaline (D) process may be produced into a slender flange (Df), and the apex of DA may be acutely produced, smooth, and sclerotized (DAS); cymbium cup-shaped, apex blunt; bulb (figs. 10, 29a, b) with embolic base promedian, embolus slender, exposed, twisted screwlike for ½ to more than 2 turns, apex (fig. 29d) usually associated with conductor (C); basal embolic sclerite (EBS) arising near embolic base (fig. 29a, b, e) and extending behind and distad of embolus, simple (fig. 32a), bi- (fig. 42a) or tripartite (fig. 46a) (with distal EBA1, proximal EBA2 and median EBA3); tegulum may

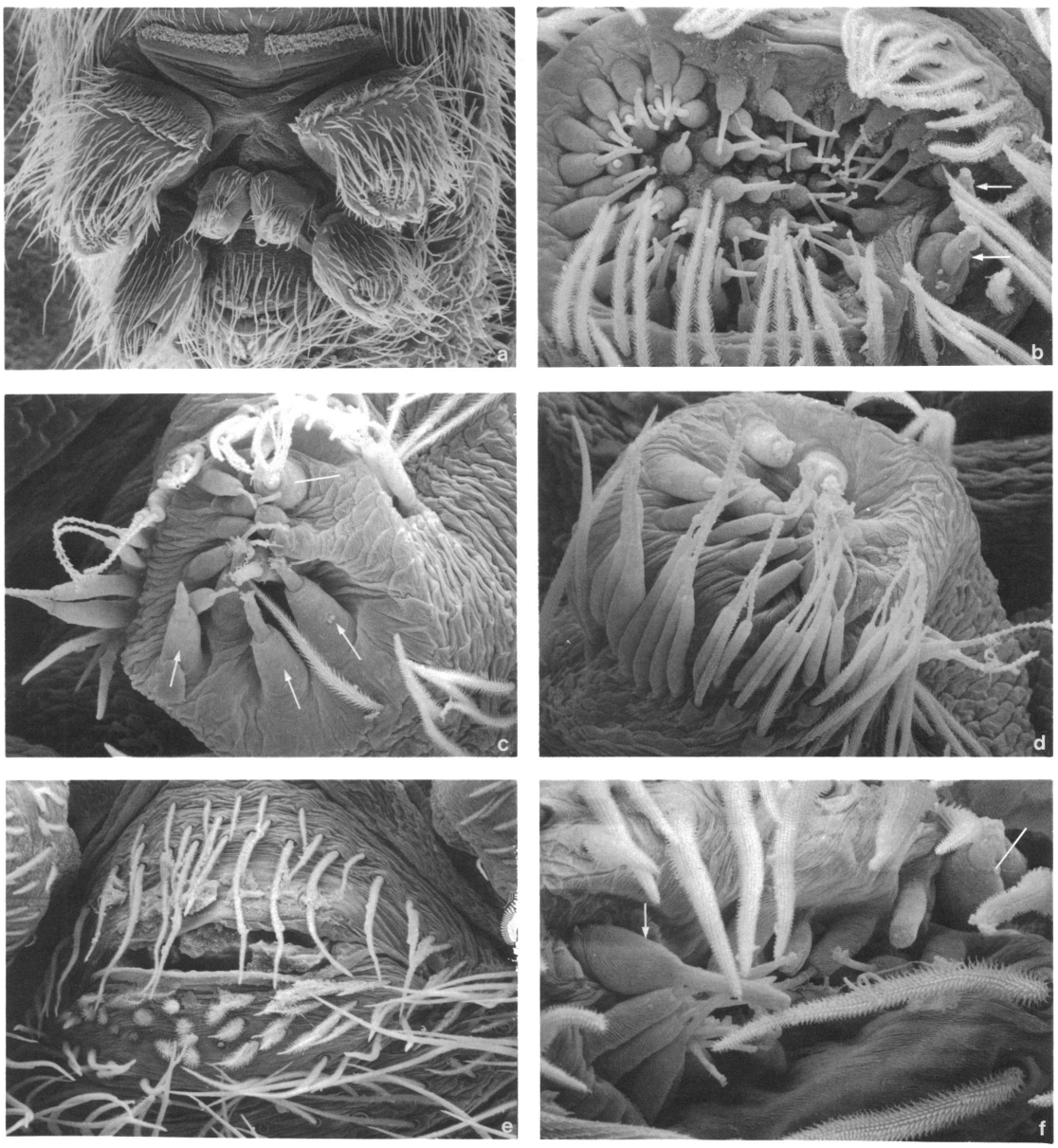

Fig. 30. *Xevioso amica*, new species, False Bay, spinnerets of female. **a.** Cribellum and spinnerets, ventral. **b.** Apex of left ALS showing piriform spigots; arrows point to major ampullate spigots (posterior at top, mesal at right). **c.** Right PMS, apex, showing piriform spigots; arrows point to tubuliformes; line to minor ampullate (anterior at top, mesal at right). **d.** Left PMS, anterior view, showing separate paracribellar spigots. **e.** Anal tubercle (anterior at top). **f.** Right PLS, apex showing aciniform spigots; line to tubuliform spigot; arrow to amaurobiid PLS spigot (anterior at top, mesal at right).

have a maximum of four processes (fig. 29e) including TA1, TA2, TA3a, and TA4, TA1 and TA3a may be present or absent, TA3a developed from retrobasal surface of tegulum and associated with retrobasal lobe (fig. 29a); apex of tegulum with well-developed cup-shaped, sclerotized conductor (C) with long, narrow retrolateral shelf (CTR) (figs. 32a, 34),

conductor may have transverse basoventral lobe (CL) (fig. 29b). Epigynum (figs. 35a–c, 43a, b) a simple plate, copulatory openings (fig. 7a) located anteriad of anterolateral margins of posterior median lobe (PML), epigynal plate rarely with ridges, protuberances, or depressions (fig. 38a, d); each spermatheca usually with large bursa copulatrix leading into a spiraled internal chamber with 4–8 turns, blind, ending, efferent duct leaving distal bulb, or antepenultimate, or subbasal spiral (figs. 12e, 43c, d); bursa copulatrix may have encircling slender, coiled hollow rod (SSG) (fig. 35e, f); spermathecae rarely simple, spherical (figs. 12d, 38c); copulatory openings laterad of fertilization ducts, fertilization ducts posterior.

COMPOSITION: Nine species. Relationships among the species are depicted on the cladogram in figure 31.

DISTRIBUTION: Southern Africa from southern Malawi south to Natal (figs. 105, 106).

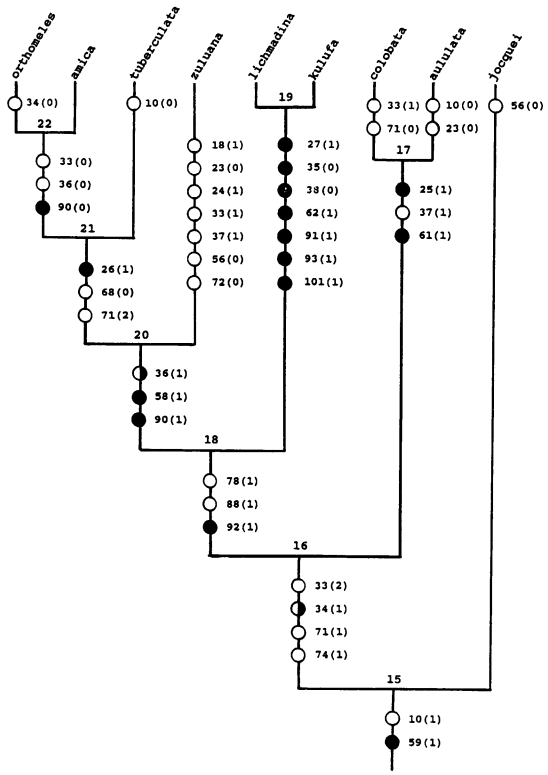

Fig. 31. Cladogram for the species of *Xevioso* (shaded circles: unique synapomorphies; half-shaded circles: uniquely derived characters which are subsequently reversed; open circles: homoplasy).

Xevioso tuberculata (Lawrence)
Figures 32a–c, 33c, d, 35c, f, 105

Haemilla tuberculata Lawrence, 1939: 276 (male lectotype, NMSA type no. 295, and female paralectotype, NMSA type no. 459, here designated, Ingwavuma, South Africa, NMSA, examined). – Roewer, 1954: 1367.
Xevioso tuberculata: Lehtinen, 1967: 275.

DIAGNOSIS: Male metatarsus I (fig. 33c, d) laterally flattened and with strong kink at midsegment forming short prodorsal process, distal to this prolateral concavity, dorsum and prolateral surface of process and inside of concavity lined with fine spinules; tegulum (fig. 32a) with retrobasal lobe, apex of TA3a bifid (fig. 32c); epigynum as in figure 35c, PML length less than width, bursa copulatrix (fig. 35f) small, ringlike, encircled by broad SSG with ventral bulb, spermathecal chamber with broad internal spiral.

MALE (lectotype): Total length 9.13. Entire specimen faded, original markings obscure. Carapace orange-brown, shading to dark red-brown anteriorly on pars cephalica; black pigment extending between AM and between lateral eyes; carapace dark red-brown, boss yellow-brown; labium and palpal coxa red-brown, sternum, coxae, trochanters, legs II–IV and palpi pale yellow-brown, unmarked, leg I orange-brown, shading to red-brown on tibia to tarsus; abdomen pale gray, venter white, unmarked. Carapace 4.69 long, 2.97 wide, margin weakly sinuate; thoracic fovea long, deep, narrowed posteriorly, length 0.21 carapace; clypeus 0.32 high; ocular area 0.45 long, 1.20 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.10:1.00:1.05, diameter of PM 0.16; AM separated by ¾ their diameter, separated from AL by AM diameter; PM separated by 1⅛ their diameter, separated from PL by 1⅘ PM; lateral eyes separated by ½ PL. Chelicerae 2.08 long, slender, with strong ventral and ventrolateral wrinkles; promargin of fang furrow with 6, retromargin with 5 large and 2 minute teeth. Sternum 2.44 long, 1.75 wide, margin sinuate, apex blunt; labium 0.91 long, 0.66 wide; palpal coxa 1.53 long, 0.72 wide.

Legs long, femur I length 1.67 times carapace width; metatarsus I (fig. 33c, d) laterally flattened and with strong kink at midsegment forming short prodorsal process, distal to this prolateral concavity, dorsum and prolateral surface of process and inside of concavity lined with fine spinules. Spination: leg I: femur d0-1-0-0, p0-0-2-1, r0-0-1-0, tibia p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-0-0-1, v2-1-1-2, r1-0-0-1; leg II: femur d1-1-0-0, p0-1-1-1, r0-1-1-0, tibia p0-1-1-0, v1-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-1-0; leg III: femur d1-1-0-0, p0-1-1-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-1-1, r1-0-0-2. Apical preening combs on metatarsi III and IV. Leg measurements:

	I	II	III	IV	Palp
Femur	4.75	3.94	3.25	4.46	2.13
Patella	1.81	1.63	1.50	1.50	0.69
Tibia	4.62	3.31	2.63	5.45	0.91
Metatarsus	4.81	3.50	3.13	4.25	—
Tarsus	1.94	1.44	1.25	1.56	1.31
Total	17.93	13.82	11.76	17.22	5.04

Palpal femur with row of 2 stout, anterobasal thorns; tibia with hyaline D process prolonged into narrow median Df projection (fig. 32b); bulb (fig. 32a, c) with embolus a narrow spiral of 2 turns with short basal lamella, EBS simple; tegulum with basal and retrolateral lobes, TA1 small, triangular, TA3a stout, conical, apex bifid, TA2 lobate; conductor with apical fringe, CL with basal desclerotized spot.

FEMALE (paralectotype): Total length 7.81. Specimen faded, marked as in male, markings obscure. Carapace 3.91 long, 2.50 wide, margin weakly sinuate; thoracic fovea length 0.18 carapace; clypeus 0.32 high; ocular area 0.35 long, 1.09 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.20:1.07:1.33, diameter of PM 0.13; AM separated by ⅔ their diameter, separated from AL by 1⅓ AM; PM separated by 1⅔ their diameter, separated from PL by 2⅙ PM; lateral eyes separated by ¼ PL. Chelicerae 1.70 long, smooth; promargin of fang furrow with 6 teeth, retromargin with 5 large teeth and 1 minute tooth. Sternum 1.94 long, 1.50 wide; labium 0.78 long, 0.63 wide; palpal coxa 1.25 long, 0.59 wide. Femur I length 1.43 times carapace width. Spination: palpus: femur d0-0-1-1, tibia p0-1-1-0, tarsus p2-2-1, v0-0-2-2, r0-1-1-0; leg I: femur d0-1-1-0, p0-0-2-2, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p1-0-0-1, v2-0-2-1, r1-0-01; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg III: femur d1-1-0-0, p1-0-1-0, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-0-0-2. Metatarsi without preening combs. Palpal femur with 2 stout anterobasal thorns. Calamistrum origin at 0.40 from metatarsus base, length 0.36 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.56	2.81	2.38	3.19	1.31
Patella	1.38	1.19	1.13	1.25	0.63
Tibia	3.19	2.19	1.69	2.88	0.81
Metatarsus	3.00	2.19	1.94	2.88	—
Tarsus	1.38	1.25	1.00	1.19	1.25
Total	12.51	9.63	8.14	11.39	4.00

Epigynum as in figure 35c, PML broad, widened posterolaterally, width greater than length; bursa copulatrix small, ringlike, encircled by broad SSG with ventral bulb, spermathecal chamber cylindrical with broad internal spiral of 4–5 turns branching from penultimate turn (fig. 35f).

DISTRIBUTION: Known only from the type locality in the Lebombo Mountains, Zululand, South Africa (fig. 105).

MATERIAL EXAMINED: SOUTH AFRICA: *Natal*: Zululand, Ingwavuma, Lebombo Mts. July 1938, elev. 2000 ft (R. F. Lawrence, NMSA), 1♂, 1♀ (*Haemilla tuberculata* Lawrence, syntypes).

Xevioso orthomeles, new species

Figures 34a–c, 35a, d, 47c, d, 106

TYPE: Holotype male from leaf litter in a shaded ravine at 1200 ft elevation, 6 km S Skukuza, Kruger National Park, Transvaal, South Africa (Dec. 17, 1984, molted in captivity; C. E. Griswold), deposited in NMSA, type no. 437.

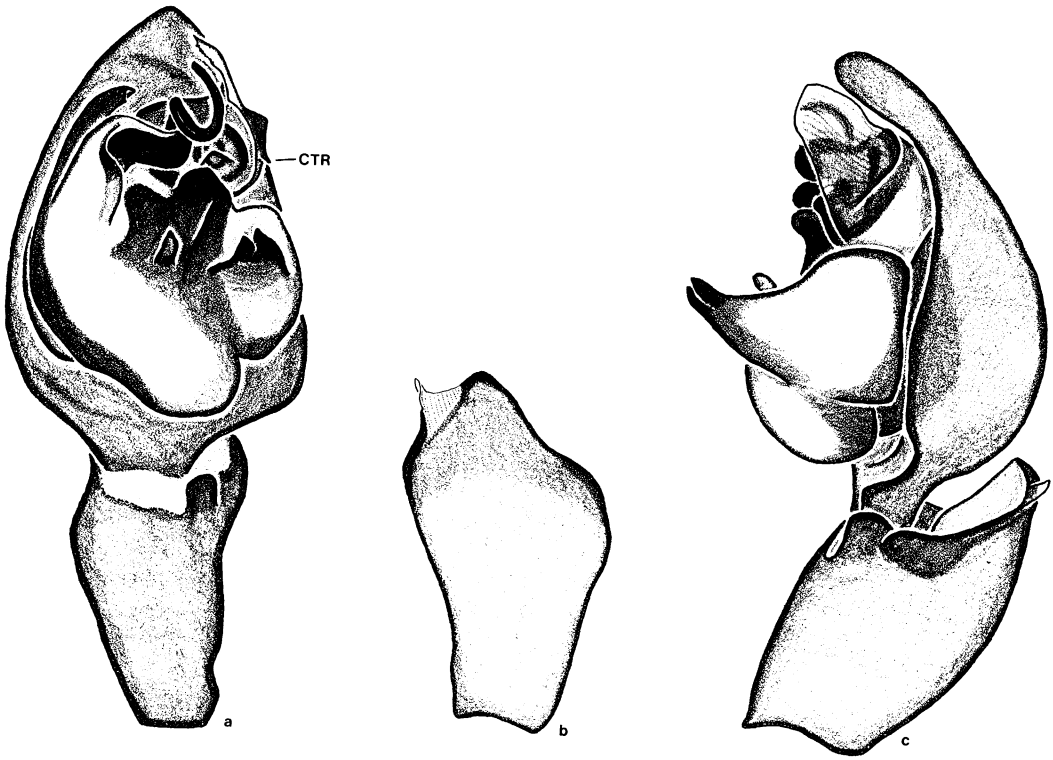

Fig. 32. *Xevioso tuberculata* (Lawrence) (lectotype of *Haemilla tuberculata* Lawrence), male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. CTR = retrolateral transverse ridge of conductor.

ETYMOLOGY: The specific name is from the Greek *orthos*, straight, and *melos*, limb, referring to the form of male leg I.

DIAGNOSIS: Male metatarsus I (fig. 47c, d) weakly sinuate basally and laterally flattened apically, otherwise unmodified; embolus (fig. 34a) a narrow spiral of 2 turns with short basal lamella, apex hidden by conductor, EBS simple; tegulum with basal and retrolateral lobes, TA3a slender, acutely pointed (fig. 34c), TA1 triangular; epigynum as in figure 35a, PML broad, lateral margin broadened posteriorly, length less than width; bursa copulatrix large, hornlike, slightly broader than spermathecal chamber (fig. 35d), encircled by narrow SSG with median bulb, spermathecal chamber cylindrical with broad internal spiral of 3–4 turns, apex with proximal diverticulum.

MALE (holotype): Total length 9.88. Carapace with pars cephalica pale yellow-white, with faint, lateral spot, pars cephalica red-brown; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown, boss yellow-white; labium and palpal coxa orange-brown, sternum, coxae, trochanters, palpi and legs yellow-white; sternum with posterior dusky infuscations, metatarsus and tarsus I orange-brown; abdomen gray-brown, dorsum with anteromedian longitudinal light area and median paired light spots; venter with paired longitudinal light bands, between these pale gray with a few posterior pairs of small, light spots. Carapace 4.44 long, 3.13 wide; thoracic fovea long, deep, narrowed posteriorly, length 0.23 carapace; clypeus 0.32 high; ocular area 0.44 long, 1.17 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.10:1.00:1.15, diameter of PM 0.16; AM separated by ½ their diameter, separated from AL by AM diameter; PM separated by 1⅓ their diameter, sep-

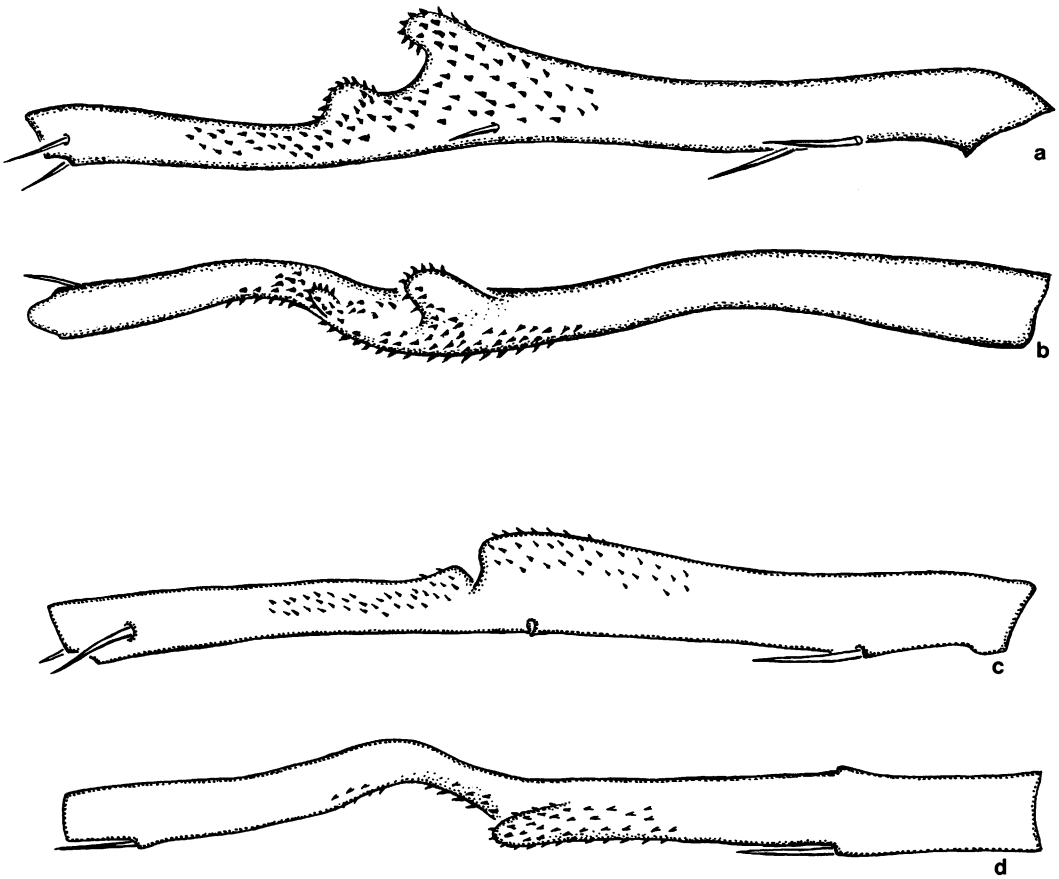

Fig. 33. *Xevioso* spp., right male metatarsi I. a, b. *zuluana* (Lawrence) (lectotype of *Haemilla zuluana* Lawrence). c, d. *tuberculata* (Lawrence) (lectotype of *Haemilla tuberculata* Lawrence). **a, c.** Prolateral. **b, d.** Dorsal.

arated from PL by 1⅘ PM; lateral eyes separated by ¼ PL. Chelicerae 2.08 long, slender, with lateral longitudinal band of spinules; wrinkled anteriorly and laterally, with strong ventral striae; promargin of fang furrow with 6, retromargin with 5 large and 2 minute teeth. Sternum 2.43 long, 1.81 wide, apex prolonged, blunt; labium 0.94 long, 0.66 wide; palpal coxa 1.50 long, 0.75 wide. Femur I length 1.64 times carapace width; metatarsus I (fig. 47c, d) weakly sinuate basally and laterally flattened apically, otherwise unmodified. Spination: leg I: femur d1-1-0-0, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-0-0-1, v2-2-0-1, r1-0-0-1; leg II: femur d0-1-1-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-1-0-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-0-0-2, v2-0-0-1, r1-0-0-2. Metatarsi II–IV with apical preening combs. Leg measurements:

	I	II	III	IV	Palp
Femur	5.13	4.06	3.56	4.75	2.25
Patella	1.94	1.63	1.50	1.56	0.69
Tibia	4.81	3.25	2.63	4.06	0.88
Metatarsus	5.13	3.56	3.19	4.50	—
Tarsus	1.94	1.50	1.25	1.56	1.38
Total	18.95	14.00	12.13	16.43	5.20

Palpal femur with row of 2 stout anterobasal thorns; tibia (fig. 34b) with hyaline D process prolonged into narrow median Df projection;

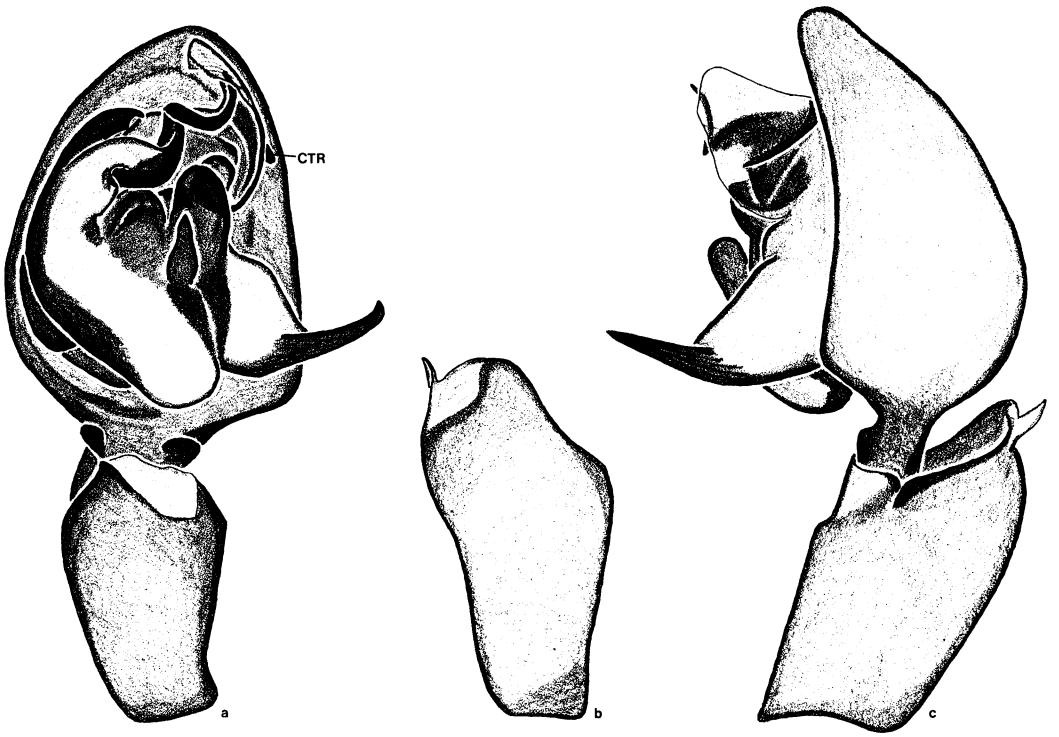

Fig. 34. *Xevioso orthomeles*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. CTR = retrolateral transverse ridge of conductor.

palpal bulb (fig. 34a, c) with embolus a narrow spiral of 2 turns with short basal lamella, EBS simple; tegulum with basal and retrolateral lobes, TA1 triangular, TA3a slender, elongate, acutely pointed, TA2 strongly lobate; conductor with apical fringe.

VARIATION: Total length 8.13–9.88; carapace length 1.36–1.42 times width; PER width 2.52–2.65 times OAL; OQP 1.25–1.27 times OQA, 1.09–1.12 times OQL; cheliceral length 6.32–6.50 times clypeal height; sternum length 1.33–1.41 times width, apex blunt or a right angle; palpal femur may have 2 additional minute basal thorns.

FEMALE (Skukuza): Total length 10.63. Carapace orange-brown, shading to red-brown anteriorly on pars cephalica, pars thoracica with faint, sclerotized anterior radii; black pigment at PM margins and extending between AM and between lateral eyes; chelicerae dark red-brown, labium and palpal coxa red-brown, sternum orange-brown; coxae, trochanters, legs and palpi yellow-brown, palpal tarsus, metatarsus and tarsus II, and tibia-tarsus I red-brown; abdomen uniform gray-brown except venter with pair of light, longitudinal bands, between these 2 rows of small, light spots. Carapace 4.81 long, 3.34 wide, margin weakly sinuate; thoracic fovea 0.25 length carapace; clypeus 0.45 high; ocular area 0.42 long, 0.53 wide; ratio of eyes AM:AL:PM:PL, 1.22:1.22:1.00:1.33, diameter of PM 0.14; AM separated by ½ their diameter, separated from AL by 1⅛ AM; PM separated by 1⅔ their diameter, separated from PL by 2¼ PM; lateral eyes separated by ⅓ PL. Chelicerae 2.24 long, venter with broad, shallow wrinkles; promargin of fang furrow with 6, retromargin with 6 large and 2 minute teeth. Sternum 2.44 long, 1.78 wide, apex blunt; labium 1.00 long, 0.72 wide; palpal coxa 1.56 long, 0.81 wide. Femur I length 1.48 times carapace width. Spination: palpus: femur d0-0-1-1, patella d0-0-1, p0-1-0, tibia d0-1-1-0, tarsus p2-2-0, v0-1-1-2-3-2, r1-0-0; leg I: femur d0-1-0-0, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-1-0-1, r0-1-0-1; leg II: fe-

mur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-0-0-2. Metatarsi II–IV with apical preening combs. Palpal femur with row of 3 anterobasal thorns, distal 2 stout. Calamistrum origin at 0.36 from metatarsus base, length 0.39 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.94	3.94	3.31	4.38	1.88
Patella	1.88	1.63	1.50	1.69	1.13
Tibia	4.44	3.06	2.38	3.69	0.81
Metatarsus	4.38	3.13	2.69	3.69	–
Tarsus	2.00	0.94	1.38	1.50	1.94
Total	17.64	12.70	11.26	14.95	5.76

Epigynum as in figure 35a, PML broad, lateral margin broadened posteriorly, length less than width; bursa copulatrix large, hornlike, slightly broader than spermathecal chamber, encircled by narrow SSG with median bulb (fig. 35d), spermathecal chamber cylindrical with broad internal spiral of 3–4 turns, efferent duct exiting basal turn, apex with proximal diverticulum visible as translucent lobe.

VARIATION: Total length 6.06–10.63; carapace length 1.33–1.52 times width; thoracic fovea 0.11–0.25 length carapace; PER width 1.13–1.20 times AER, 2.53–3.73 times OAL; OQP 1.13–1.40 times OQA, 0.73–1.43 times OQL; cheliceral length 4.81–6.36 times clypeal height, smooth to wrinkled, promargin of fang furrow with 5 or 6, retromargin with 6 or 7 teeth; sternum length 1.09–1.40 times width; labium length 1.14–1.39 times width.

NATURAL HISTORY: Most label data suggest that this species occurs primarily in bushveld rather than forest. I have collected this species in the Kruger National Park in dense bushveld where the spiders occurred in leaf litter beneath large trees along small, dry streamcourses.

DISTRIBUTION: Swaziland, lowveld of northeastern South Africa, and north to the eastern mountains of Zimbabwe (fig. 106).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Transvaal*: Sabie Sand Loop, 2½ mi from Skukuza, Kruger National Park, Oct. 22, 1962 (R. F. Lawrence, NMSA), 2♀; Barberton, Mar. 1960 (R. F. Lawrence, NMSA), 1♂; Lochiel, Nov. 12, 1956 (M. Martin, NCP), 1♀. SWAZILAND: Mbabane, Oct. 17, 1938 (V. Fitsimmons, TMP), 1♀. ZIMBABWE: Sam's Kraal, 2 mi N Lisutu, Aug. 26, 1969 (I. R. Mackay, NMSA), 1♀; Chirinda Forest, Mt. Selinda, Dec. 1935 (V. Fitsimmons, TMP), 1♀; 12 mi S Chipinga, Mar. 19, 1958, elev. 970 m (E. S. Ross & R. E. Leech, CAS), 1♀.

Xevioso amica, new species

Figures 5c, d, 6a, c, e, f, 7a, e, f, 10a, b, 12e, 14a–d, 15b, 16b, 29a–e, 30a–f, 35b, e, 36a–c, 47a, b, 105

TYPES: Holotype male, NMSA type no. 443, from indigenous coastal forest at Charter's Creek, Lake St. Lucia, Zululand, Natal, South Africa (Nov. 19, 1984, molted in captivity; C. E. Griswold and T. Meikle-Griswold), deposited in NMSA; paratypes, 5 males and 14 females, 1 pair each in AMNH and MRAC, remainder in NMSA.

ETYMOLOGY: The specific name is from the Latin word for friend.

DIAGNOSIS: Male metatarsus I (fig. 47a, b) with median kink and short, blunt, prodorsal process; embolus a narrow spiral of 2 turns with short basal lamella, apex exposed, EBS simple (figs. 29a, b, e, 36a); tegulum with basal and retrolateral lobes, TA3a slender, acutely pointed (fig. 36c), TA1 triangular (fig. 29e); epigynum as in figures 7a, 35b, PML broad, lateral margin broadened posteriorly, length less than width; bursa copulatrix large, hornlike, much broader than spermathecal chamber (fig. 35e), encircled by narrow SSG with median bulb, spermathecal chamber (fig. 12e) cylindrical with broad internal spiral of 3–4 turns.

MALE (holotype): Total length 6.25. Carapace pale yellow-brown, black pigment surrounding each eye and extending between AM and between lateral eyes; with faint, broad, dusky, v-shaped mark anteriad of thoracic fovea, and with thin, dusky, longitudinal line on each side extending anteriorly on to pars cephalica, pars thoracica with 3 pairs of short, triangular submarginal radii; chelicerae red-brown, sternum, labium, coxae, and trochanters pale yellow-brown, sternum and leg cox-

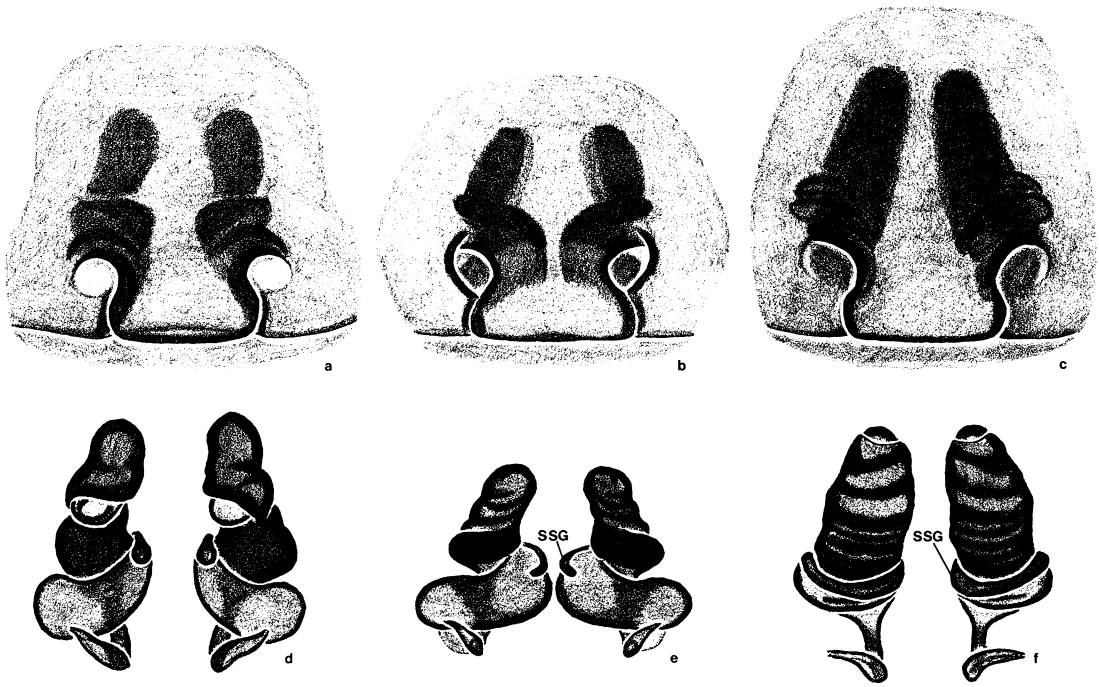

Fig. 35. *Xevioso* spp., female genitalia. a, d. *orthomeles*, new species. a. Skukuza. d. Sabie Sand. b, e. *amica*, paratype, new species c, f. *tuberculata* (Lawrence) (paralectotype of *Haemilla tuberculata* Lawrence). **a–c.** Epigyna, ventral. **d–f.** Spermathecae, dorsal. SSG = coiled hollow rod encircling bursae.

ae infuscate; legs and palpi pale yellow-brown, unmarked, metatarsus, tarsus, and apex of tibia I red-brown; abdomen dark gray-brown, dorsum paler in cardiac region, venter with lateral pair of thin, broken, longitudinal light bands, between these pale gray-brown with several small, light spots. Carapace 3.16 long, 2.25 wide, sides entire; thoracic fovea deep, narrowed posteriorly, 0.16 length carapace. Clypeus 0.21 high. Ocular area 0.30 long, 0.80 wide; ratio of eyes AM:AL:PM:PL, 1.07:1.20:1.00:1.07, diameter of PM 0.12; AM separated by their diameter, separated from AL by 1¼ AM; PM separated by 1 1/6 their diameter, separated from PL by 1⅛ PM; lateral eyes separated by ¼ PL. Chelicerae 1.36 long, with longitudinal row of spinules along lateral margin (fig. 7e, f), and fine anterior wrinkles; promargin of fang furrow with 5, retromargin with 4–5 large and 2 minute teeth. Sternum 1.63 long, 1.25 wide, sides entire, apex blunt; labium 0.59 long, 0.47 wide; palpal coxa 0.99 long, 0.41 wide. Femur I length 1.69 times carapace width; metatarsus I (fig. 47a, b) with median kink and short, blunt, prodorsal process. Spination: leg I: femur d1-1-0-0, p0-1-1-1, r0-0-1-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-1, v0-2-2-1, r0-1-1-0; leg II: femur d1-1-0-0, p0-1-0-1, r0-0-0-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0, v2-2-0-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-1-0-1, r0-0-0-1, tibia d0-0-1-0, p0-1-1-0, metatarsus p1-1-0-2, v0-2-2-1, r1-1-0-2; leg IV: femur d1-1-2, tibia d1-0-0-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-2-1, r1-1-0-2. Metatarsi II–IV with apical preening combs. Leg measurements:

	I	II	III	IV	Palp
Femur	3.81	2.94	2.63	3.50	1.56
Patella	1.25	1.19	1.06	1.19	0.53
Tibia	3.56	2.50	2.00	3.13	0.50
Metatarsus	3.88	2.81	2.38	3.38	–
Tarsus	1.75	1.25	1.13	1.25	1.06
Total	14.25	10.69	9.20	12.45	3.65

Palpal femur with row of 3 anterobasal thorns, distal two much stouter. Tibia with hyaline D process prolonged into narrow median

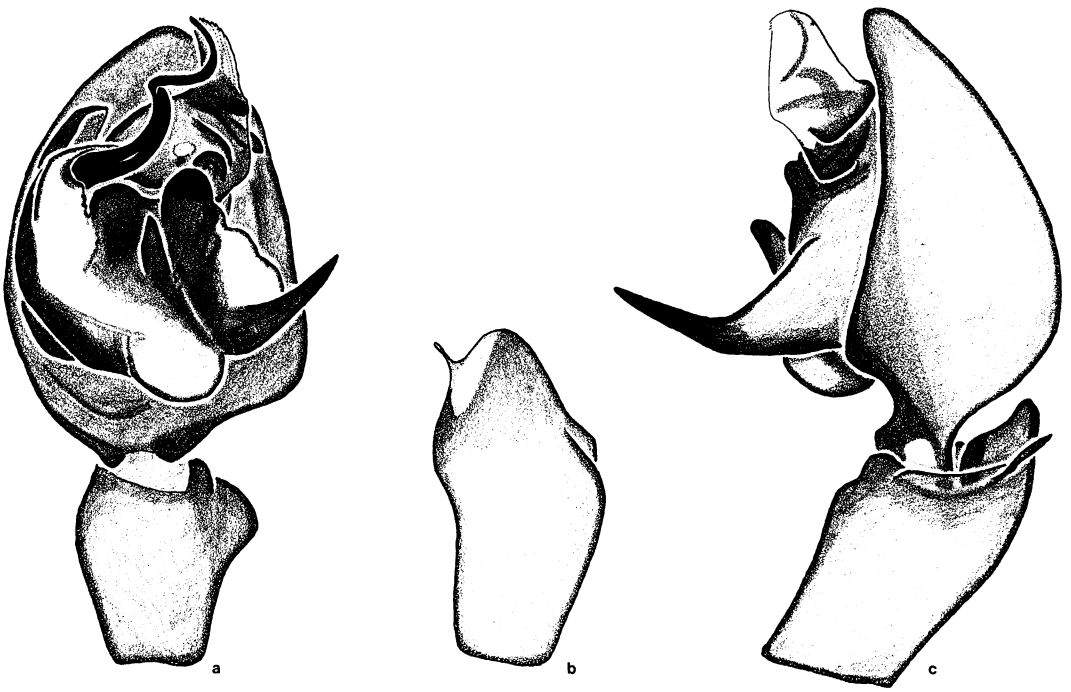

Fig. 36. *Xevioso amica*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

projection (Df) (figs. 29c, 36b); palpal bulb (fig. 36a, c) with embolus a narrow spiral of 2 turns with short basal lamella, EBS simple; tegulum with basal and retrolateral lobes, TA1 small, triangular, TA3a slender, elongate, acutely pointed, TA2 strongly lobate; conductor with apical fringe, CL with desclerotized spot.

VARIATION: Total length 5.94–8.13; carapace length 1.38–1.44 times width, markings distinct to obscure, prefoveal v-shaped mark present or absent; PER width 1.09–1.15 times AER, 2.50–2.80 times OAL; OQP 1.25–1.27 times OQA, 1.14–1.26 times OQL; cheliceral length 5.37–6.54 times clypeal height, retromargin of fang furrow with 6–8 teeth (fig. 14a, b); apex of sternum blunt to narrowed; labium length 1.26–1.47 times width; femur I length 1.69–1.93 times carapace width; abdomen with anterodorsal light markings paired or diffuse.

FEMALE (paratype): Total length 8.63. Markings as in male except carapace yellow-brown, darkened to red-brown anteriorly; chelicerae dark red-brown, boss yellow-brown; labium and palpal coxa red-brown; sternum, leg coxae, trochanters, and legs yellow-brown; palpal tarsus, metatarsi-tarsi I and II, and apex of tibia I red-brown. Carapace 4.38 long, 2.81 wide; thoracic fovea 0.18 length carapace; clypeus 0.35 high; ocular area 0.40 long, 1.15 wide; ratio of eyes AM:AL: PM:PL, 1.18:1.18:1.00:1.06, diameter of PM 0.14; AM separated by ½ their diameter, separated from AL by ⅘ AM; PM separated by 1½ their diameter, separated from PL by twice PM; lateral eyes separated by ½ PL. Chelicerae 1.84 long, smooth with a few lateral spinules; promargin of fang furrow with 6 teeth, retromargin with 6 large teeth and 1 minute tooth. Sternum 2.19 long, 1.66 wide, sides weakly sinuate; labium 0.91 long, 0.66 wide; palpal coxa 1.38 long, 0.72 wide. Femur I length 1.58 times carapace width. Spination: palpus: femur d0-0-1-1, patella d0-0-1, tibia d1-1-0, p0-0-1, r0-0-1, tarsus p2-2-0, v1-1-2-2-2, r1-2-0; leg I: femur d1-1-0, p0-1-1, r0-1-1-1, tibia p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus d0-1-0-1, p0-0-1-2, v2-2-0-1, r0-0-0-1; leg II: femur d1-1-0-0, p0-0-1-0, r0-

1-1-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v1-1-0-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia d1-1-1-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-2-1, r1-1-0-2. Palpal femur with anterobasal row of 2 stout thorns. Origin of calamistrum at 0.35 from metatarsus IV base, length 0.35 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.50	3.63	2.94	4.13	1.63
Patella	1.69	1.56	1.38	1.56	0.69
Tibia	4.00	2.63	2.25	3.44	0.94
Metatarsus	4.19	3.06	2.62	3.56	–
Tarsus	1.81	1.50	1.25	1.44	1.63
Total	16.19	12.38	10.44	14.13	4.89

Epigynum as in figure 35b, PML broad, lateral margin broadened posteriorly, length less than width; bursa copulatrix large, hornlike, much broader than spermathecal chamber, encircled by narrow SSG with median bulb, spermathecal chamber cylindrical with broad internal spiral of 3–4 turns, efferent duct exiting basal turn (fig. 35e).

VARIATION: Total length 7.00–10.88; carapace length 1.41–1.56 times width; PER width 1.14–1.21 times AER, 2.88–3.28 times OAL; OQP 1.12–1.33 times OQA, 1.12–1.40 times OQL; cheliceral length 5.21–5.50 times clypeal height, retromargin of fang furrow with 7 or 8 teeth; sternum length 1.29–1.34 times width, apex a right angle or blunt; labium length 1.26–1.38 times width.

NATURAL HISTORY: These are the commonest cribellate spiders in coastal dune forests and swamp forests in Zululand, where I have collected them beneath rocks and logs and beneath tree bark. A gravid female was collected at Lake St. Lucia in Zululand in June and made an egg sac containing 41 eggs. Another female was collected at Lake St. Lucia in November with an egg sac containing 85 eggs. The egg sac found in September with a female of from Empangeni, Zululand, contained 100 eggs.

DISTRIBUTION: Coastal Zululand, South Africa (fig. 105).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Natal*: Mpophomeni Trail, False Bay, Lake St. Lucia, June 1, 1985, indigenous forest (C. E. Griswold, NMSA), 5♀; Empangeni, May 20, 1984, 1♀, Sept. 27, 1984, 1♀ (P. Reavell, NMSA), June 4, 1983, 1♂ (P. Reavell, NCP); Enseleni Nature Reserve, Jan. 19, 1986, *Ficus-Barringtonia* swamp forest (C. E. Griswold & T. Meikle-Griswold, NMSA), 1♀; 33 km from Louwsburg on Nongoma Rd., May 9, 1977 (K. Sheasy, NCP), 1♀.

Xevioso zuluana (Lawrence)

Figures 33a, b, 37a–c, 38a, b, 105

Haemilla zuluana Lawrence, 1939: 278 (male lectotype, here designated, from Zululand, South Africa, NMSA; paralectotypes, 3 males, same data, SAM, examined). – Roewer, 1954: 1367.
Xevioso zuluana: Lehtinen, 1967: 275.

NOTE: Lawrence (1939: 278) stated that 4 cotype males were deposited in the South African Museum. I located a single male labeled "syntype" in the Natal Museum, and accordingly designated the NMSA specimen as lectotype. Subsequently the remaining 3 syntype females were located in the SAM, and these are accordingly designated as paralectotypes.

DIAGNOSIS: Male metatarsus I (fig. 33a, b) with large, dorsal process at midsegment and just distad of this a dorsal concavity and short, prodorsal process; male palpal tibia (fig. 37b) with 2 widely separated elongate dorsal processes; palpal bulb (fig. 37a, c) with embolus making a broad spiral equal to width of cymbium, tegulum with broadly forked basal TA3a process, conductor with median hook extending over embolus; epigynum as in figure 38a, with paired median lobes, bursa copulatrix a very large spherical chamber encircled by slender SSG with dorsal bulb (fig. 38b), spermathecal chamber slender with internal spiral of 6–7 turns.

MALE (lectotype): Total length 6.69. Specimen entirely faded to pale yellow-white, markings obscure; carapace apparently unmarked except darkened anteriorly on pars cephalica; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae yellow-brown, venter, palpi, legs and abdomen pale yellow-white. Carapace 3.19 long, 2.34 wide, margin entire;

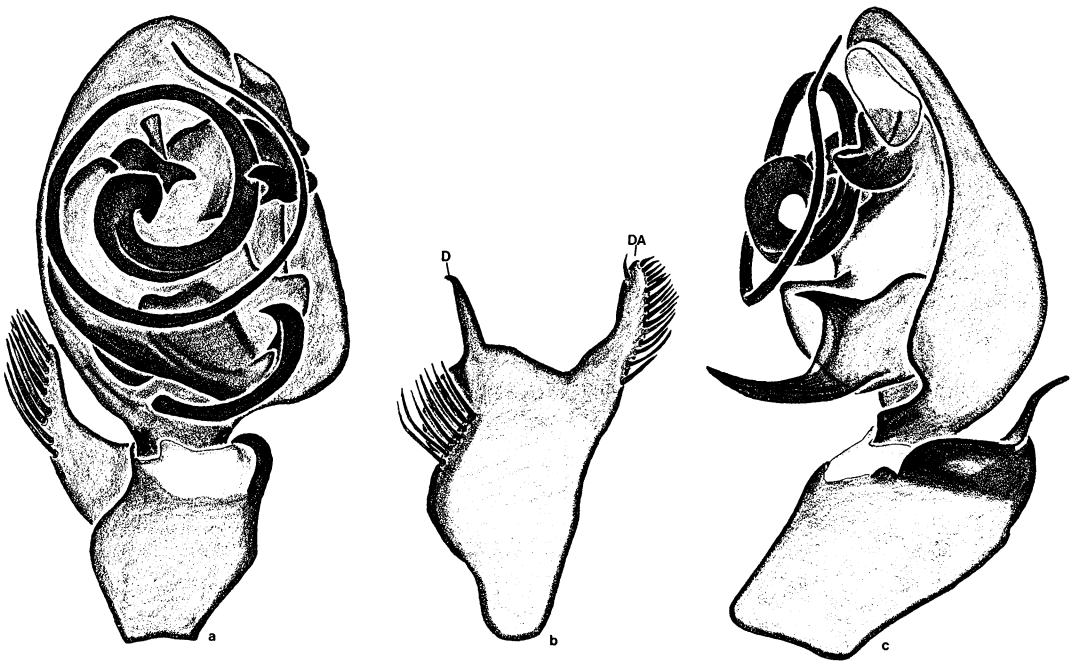

Fig. 37. *Xevioso zuluana* (Lawrence) (lectotype of *Haemilla zuluana* Lawrence), male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. D = dorsal tibial process; DA = anterodorsal tibial lobe.

thoracic fovea 0.12 carapace length; clypeus 0.29 high; ocular area 0.27 long, 0.82 wide; ratio of eyes AM:AL:PM:PL, 1.07:1.36:1.00:1.14, diameter of PM 0.11; AM separated by ½ their diameter, separated from AL by ⅘ AM; PM separated by 1⅘ their diameter, separated from PL by 1½ PM; lateral eyes separated by ¼ PL. Chelicerae 1.47 long, with longitudinal lateral band of spinules and strong ventrolateral striae; promargin of fang furrow with 6, retromargin with 2–4 large and 2 minute teeth. Sternum 1.72 long, 1.38 wide, margin entire, apex a right angle; labium 0.59 long, 0.50 wide; palpal coxa 0.97 long, 0.47 wide. Legs long, femur I length 1.73 times carapace width; metatarsus I (fig. 33a, b) with basal half sinuate, large dorsal process at midsegment and just distad of this a dorsal concavity and short, prodorsal process; apices of processes covered with spinules, and a few spinules in intervening cavity. Spination: leg I: femur d0-1-0-0, p0-0-1-1, tibia v0-2-0-2, metatarsus p0-0-0-1, v2-1-1-1, r0-0; leg II: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-0-2-2, r0-0-0-1, metatarsus p1-1-0-2, v0-2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, v0-1-1-1, r0-1-0-1, tibia d1-0-1-1-0, p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-1-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2. Apical combs on metatarsi II–IV. Leg measurements:

	I	II	III	IV	Palp
Femur	4.06	3.19	2.88	4.06	1.19
Patella	1.25	1.13	1.09	1.25	0.63
Tibia	3.81	2.50	2.06	3.56	0.50
Metatarsus	3.06	2.75	2.44	3.69	—
Tarsus	1.75	1.19	1.06	1.25	1.13
Total	13.93	10.76	9.53	13.81	3.45

Palpal femur with proximal group of 3 small and row of 3 anterobasal thorns, distal 2 stoutest; male palpal tibia (fig. 37b) with widely separated elongate setose DA and acutely pointed, median, sclerotized D; palpal bulb (fig. 37a, c) with embolus making a broad spiral of nearly 2 turns equal to width of cymbium, EBS small, bipartite with broad, quadrate EBA1 and slender EBA2, TA1 broadly triangular, flexible, appressed to base of TA3a, tegulum simple with broadly forked basal

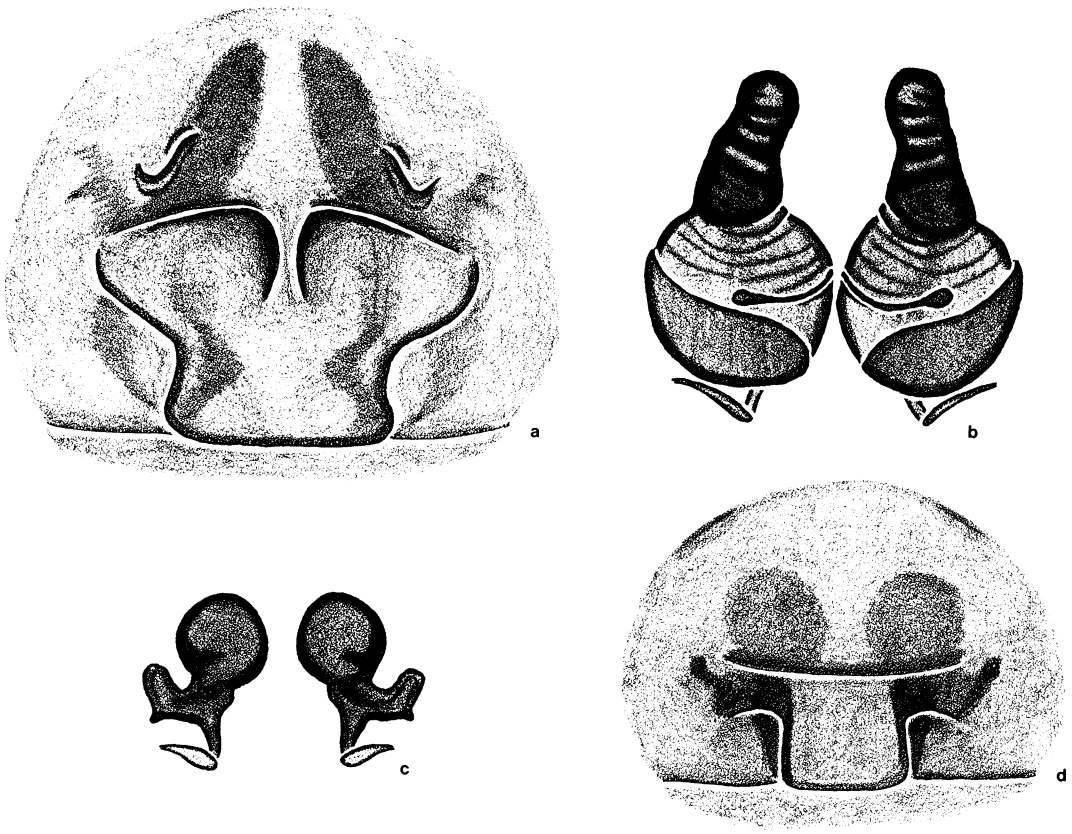

Fig. 38. *Xevioso* spp., female genitalia. a, b. *zuluana* (Lawrence). a. Mfongosi. b. Middledrift. c, d. *aululata*, new species, Bergvliet. **a, d.** Epigyna, ventral. **b, c.** Spermathecae, dorsal.

TA3a process, conductor with small median hook extending mesally over embolus, with weak proximal projection, lacking apical fringe.

FEMALE (Emakabelini): Total length 6.81. Carapace orange-brown, darker anteriorly on pars cephalica, pars thoracica with faint sclerotized radii; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae, labium and palpal coxa red-brown, sternum, coxae, trochanters, legs and palpi yellow-brown, unmarked; abdomen uniform gray-brown, venter with pair of thin, longitudinal light bands. Carapace 3.13 long, 2.09 wide; thoracic fovea 0.14 carapace length; clypeus 0.21 high; ocular area 1.31 long, 0.91 wide; ratio of eyes AM:AL: PM:PL, 1.00:1.38:1.08:1.31, diameter of PM 0.11; AM separated by ¾ their diameter, separated from AL by AM diameter; PM separated by 1½ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ⅖ PL. Chelicerae 1.46 long, with thin longitudinal band of lateral spinules and weak ventrolateral wrinkles; promargin of fang furrow with 5, retromargin with 5 large and 2 minute teeth. Sternum 1.63 long, 1.28 wide; labium 0.59 long, 0.56 wide; palpal coxa 1.00 long, 0.53 wide. Femur I length 1.46 times carapace width. Palpal femur with row of 3 anterobasal thorns, distal 2 very stout. Spination: palpus: femur d0-1-2, patella d1-0-1, p0-1-0, r0-1-0, tibia d0-0-1, p2-1-2, tarsus p1-2-2-1, v0-0-1-2-1-2-3; leg I: d1-1-0-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v0-2-0-2, metatarsus p0-0-0-1, v2-2-0-1, r0-0-0-1; leg II: femur d1-1-0-0, v0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-2-2, r0-0-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg III: femur d1-1-0-0, v0-1-1-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d1-1-0-0,

p0-0-1, r0-0-1, tibia p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-0-1-2. Apical combs on metatarsi II–IV. Calamistrum origin 0.41 from metatarsus base, length 0.32 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.06	2.31	2.06	2.75	1.19
Patella	1.13	0.94	1.00	1.06	0.50
Tibia	2.63	1.69	1.50	2.38	0.63
Metatarsus	2.50	1.88	1.69	2.31	–
Tarsus	1.38	1.06	0.88	1.13	1.13
Total	10.70	7.88	7.13	9.63	3.45

Epigynum as in figure 38a, with paired median lobes and paired anterior depressions, PML broad, width greater than length, expanded posteriorly, bursa copulatrix a very large spherical chamber encircled by slender SSG with dorsal bulb (fig. 38b), spermathecal chamber slender with internal spiral of 6–7 turns, efferent duct extending posteriad from penultimate turn.

VARIATION: Total length 6.25–6.81; carapace length 1.49–1.55 times width; PER width 1.16–1.21 times AER, 2.89–3.00 times OAL; OQP times 1.39–1.53 OQA, 1.28–1.35 times OQL; cheliceral length 4.69–7.00 times clypeal height, retromargin of fang furrow with 6 or 7 teeth; sternum length 1.25–1.27 times width; labium length 1.06–1.10 times width; femur I length 1.37–1.46 times carapace width.

DISTRIBUTION: Middle of Tugela River valley, Zululand, South Africa (fig. 105).

MATERIAL EXAMINED: SOUTH AFRICA: *Natal*: Zululand, Mfongosi, Feb. 1915 (W. Jones, NMSA), 1♂ (*Haemilla zuluana* Lawrence, syntype) (W. Jones, SAM), 3♂ (*Haemilla zuluana* Lawrence, syntypes) Feb. 1918 (W. Jones, SAM), 3♀; Middledrift, Tugela River, Oct. 1940 (R. F. Lawrence, NMSA), 4♀; Emakabeleni, 8 mi N Kranskop, Apr. 10, 1958, elev. 1075 m (E. S. Ross & R. E. Leech, CAS), 2♀.

Xevioso aululata, new species

Figures 12d, 38c, d, 39a–c, 40c, d, 106

TYPES: Holotype male from pitfall trap in pine plantation at Bergvliet State Forest in the Drakensberg Mts. near Sabie, Transvaal, South Africa (Oct. 23, 1986; A. van den Berg), deposited in NCP; paratype male, same data, deposited in AMNH.

ETYMOLOGY: The specific name is from the Latin *aulula*, a small pipkin or pot, referring to the unusual form of the spermathecae.

DIAGNOSIS: Male metatarsus I (fig. 40c, d) with short, projecting dorsal spur at midsegment, distal to this a weak kink, a few spinules at apex of spur and along retrolateral surface of kink; palpal tibia with elongate DAS, hyaline D process greatly reduced (fig. 39b); embolus short, stout, making less than 1 turn (fig. 39a), TA1 slender, TA3a slender and pointed (fig. 39c), proximal margin of conductor simple, without proximal projection; epigynum as in figure 38d, with transverse ridge, lateral margins of PML parallel, each spermatheca with small lateral and simple median spherical chamber (figs. 12d, 38c).

MALE (holotype): Total length 4.31. Carapace pale yellow-brown, slightly darker anteriorly on pars cephalica, dusky along margin; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown; labium and palpal coxa yellow-brown, palpal coxa lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-white, unmarked, legs shading to yellow-brown distally; abdomen dark gray, unmarked. Carapace 2.16 long, 1.44 wide; thoracic fovea deep, narrowed posteriorly, length 0.17 carapace; clypeus 0.11 high; ocular area 0.24 long, 0.56 wide; ratio of eyes AM:AL:PM:PL, 1.10:1.40:1.00:1.40, diameter of PM 0.08; AM separated by ⅓ their diameter, separated from AL by ⅔ AM; PM separated by their diameter, separated from PL by PM diameter; lateral eyes separated by ⅙ PL diameter. Chelicerae 1.09 long, slender, with fine anterior wrinkles, promargin of fang furrow with 5, retromargin with 4 large and 2 small teeth. Sternum 1.16 long, 0.91 wide, margin entire, apex prolonged, blunt; labium 0.38 long, 0.34 wide; palpal coxa 0.66 long, 0.34 wide. Femur I length 2.05 times carapace width; metatarsus I (fig. 40c, d) with short, projecting dorsal spur at midsegment, distal to this a weak kink, with a few spinules at apex of spur and along retrolateral surface of kink. Spination: palpus: femur d0-0-0-1; leg I: femur d0-0-1-0, p0-0-1-1, tibia p0-0-1-0, v1-2-1, metatarsus p0-0-0-1, v2-1-0-1, r0-0-0-1; leg II: femur d1-1-0-0, p0-0-0-1, r0-

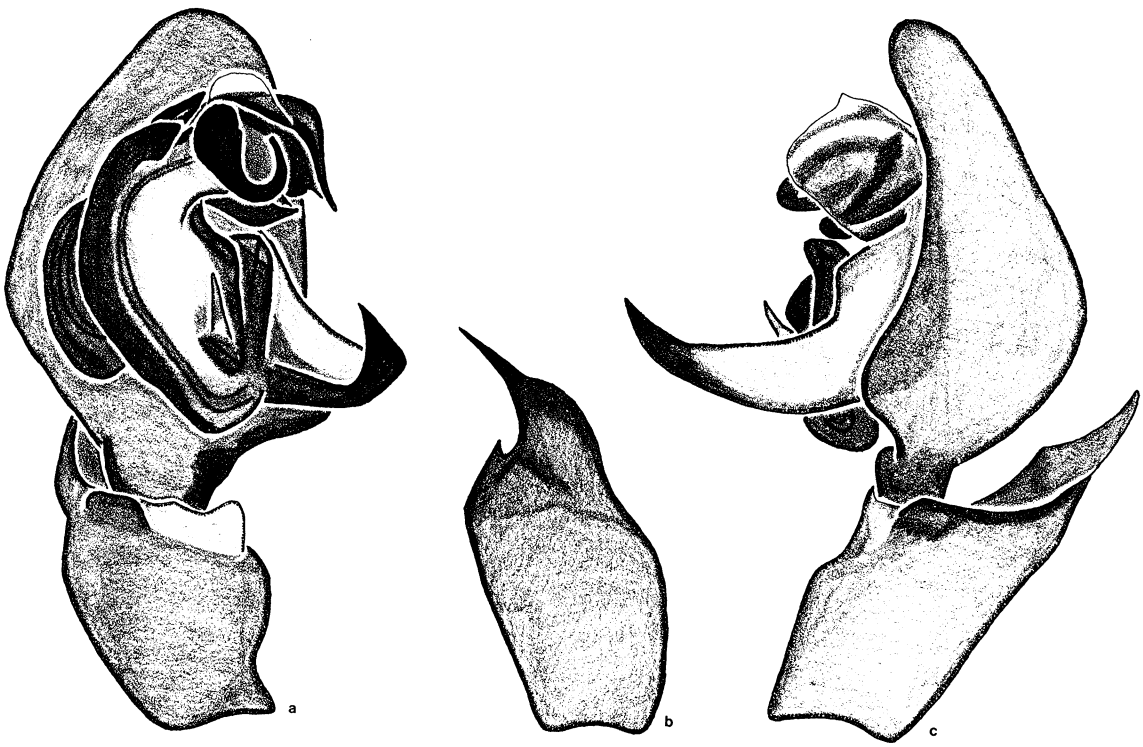

Fig. 39. *Xevioso aululata*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

0-0-1, tibia p0-1-1-0, v2-2-0-2, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-0-1-2, v2-0-2-1, r1-0-1-2. Metatarsi II–IV with apical preening combs. Leg measurements:

	I	II	III	IV	Palp
Femur	2.38	1.88	1.63	2.44	0.88
Patella	0.88	0.69	0.69	0.75	0.29
Tibia	2.25	1.50	1.19	2.19	0.31
Metatarsus	2.19	1.50	1.44	2.06	—
Tarsus	1.13	0.94	0.75	0.94	0.63
Total	8.83	6.51	5.70	8.38	2.11

Palpal femur with row of 3 anterobasal thorns, distal 2 stoutest; palpal tibia (fig. 39b) with elongate, acutely pointed DAS, hyaline D process greatly reduced, not reaching DAS apex; palpal bulb (fig. 39a, c) with embolus short, making less than 1 turn, base stout, nearly entire or deeply cleft; EBS small, bipartite, EBA1 lobate, EBA2 broad; tegulum with basal and retrobasal lobes, TA1 slender, TA3a slender and pointed, curved apically, TA2 lobate, proximal margin of conductor simple, without proximal projection, apical fringe present.

VARIATION: Total length 3.75–4.67; carapace length 1.34–1.50 times width; thoracic fovea 0.10–0.17 length carapace; PER width 1.15–1.25 times AER, 2.33–2.78 times OAL; OQP 1.36–1.52 times OQA, 1.17–1.30 times OQL; cheliceral length 6.25–9.71 times clypeal height; sternum length 1.21–1.31 times width; labium length 1.00–1.16 times width; femur I length 1.80–2.05 times carapace width; palpal tibia with DAS straight (Bergvliet: figure 39b) or curved (Ohrigstad); embolic base entire (fig. 39a) or deeply cleft (Ohrigstad).

FEMALE (Bergvliet): Total length 5.38. Markings essentially as in male except darker; abdomen gray, unmarked. Carapace 2.66 long, 1.78 wide; thoracic fovea narrowed posteriorly, length 0.13 carapace; clypeus 0.22

high; ocular area 0.24 long, 0.78 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.29:1.00:1.29, diameter of PM 0.11; AM separated by ½ their diameter, separated from AL by ¾ AM; PM separated by their diameter, separated from PL by 1⅝ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.30 long, robust, smooth, promargin of fang furrow with 5, retromargin with 5 large and 2 minute teeth. Sternum 1.34 long, 1.06 wide; labium 0.53 long, 0.45 wide; palpal coxa 0.84 long, 0.47 wide. Femur I length 1.40 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-0, p0-1-0, tibia p0-1-2-0, tarsus p2-2-1, v2-2-2-1-3, r1-0-0; leg I: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v0-0-2-2, r0-1-0-0, metatarsus p0-0-0-1, v2-0-2-1, r0-0-0-1; leg II: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v1-2-2, r0-1-1-0, metatarsus p0-1-0-2, v2-2-1, r0-0-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r0-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p1-0-1-2, v2-1-1, r1-0-1-2. Metatarsi II–IV with apical preening combs. Palpal femur with row of 2 anterobasal thorns. Calamistrum origin at 0.41 from metatarsus base, length 0.23 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.50	2.00	1.69	2.44	1.00
Patella	1.00	0.88	0.75	0.94	0.38
Tibia	2.31	1.50	1.25	2.13	0.53
Metatarsus	2.13	2.25	1.44	2.00	—
Tarsus	1.19	0.94	0.81	1.00	0.94
Total	9.13	7.57	5.94	8.51	2.85

Epigynum as in figure 38d, with transverse ridge, lateral margins of PML parallel; each spermatheca (figs. 12e, 38c) with simple, median spherical chamber and small lateral chamber, afferent duct making ½ twist to median chamber, efferent duct arising from twist.

VARIATION: Total length 3.50–6.08; thoracic fovea length 0.11–0.17 carapace length; PER width 1.16–1.20 times AER, 1.33–1.50 times OAL; OQP 1.33–1.50 times OQA, 1.33–1.45 times OQL; cheliceral length 5.79–8.20 times clypeal height; sternum length 1.14–1.21 times width; labium length 1.00–1.27 times width.

DISTRIBUTION: Drakensberg Mountains and eastward lowlands, Transvaal Province, South Africa (fig. 106).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Transvaal*: Bergvliet State Forest, Sabie, Aug. 21, 1984, pitfall trap in pine forest (A. van den Berg, NCP), 1♀; Ohrigstad, Lydenburg Dist., Mar. 27, 1962 (N. Leleup, MRAC), 3♂, 5♀; Crocodile River bridge, Nelspruit Dist., Oct. 1961 (N. Leleup, MRAC), 1♀.

Xevioso colobata, new species

Figures 40a, b, 41a–c, 106

TYPE: Holotype male from indigenous forest at an elevation of 6000 ft in the Drakensberg Mts. at Mariepskop, Transvaal, South Africa (Mar. 1960; R. F. Lawrence), deposited in NMSA, type no. 440.

ETYMOLOGY: The specific name is from the Greek *kolobos*, meaning shortened or stunted, referring to the embolus.

DIAGNOSIS: Male metatarsus I (fig. 40a, b) weakly sinuate basally, with short, sharp retrodorsal spur at midsegment, distad of this a prolateral concavity, with field of spinules on distal portion of concavity. Male palpal tibia (fig. 41b) with acutely pointed DAS, hyaline D process extending to DAS apex; embolus (fig. 41a) short, stout, making less than 1 turn, TA1 absent, conductor with acute proximal flange.

MALE (holotype): Total length 3.69. Carapace pale yellow-brown, unmarked except for black pigment surrounding each eye and extending between AM and between lateral eyes, and with faint, sclerotized radii extending from thoracic fovea and along margin of pars cephalica; chelicerae orange-brown, sternum and labium pale orange-brown, coxae, legs and palpi pale yellow-brown, unmarked. Abdomen gray-brown, with anterodorsal central light area, venter pale, uniform. Carapace 1.84 long, 1.34 wide; thoracic fovea long, narrow, length 0.19 carapace; clypeus 0.13 high; ocular area 0.21 long, 0.50 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.33:1.00:1.11, diameter of PM 0.07; AM separated by ½ their diameter, separated from AL by ⅔ AM; PM separated by their diameter, separated from PL by 1⅙ PM; lateral eyes separated by ⅛ PL. Chelicerae 0.88 long, slender,

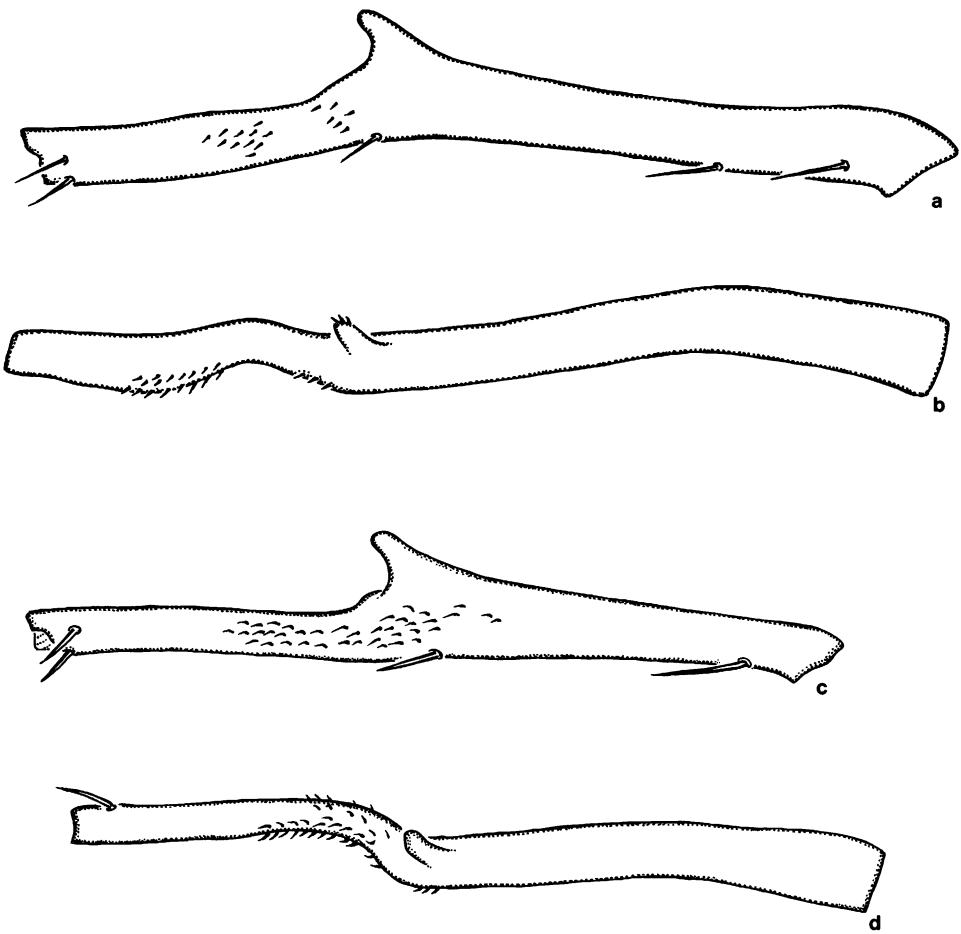

Fig. 40. *Xevioso* spp., right male metatarsi I. a, b. *colobata*, new species, holotype. c, d. *aululata*, new species, holotype. **a, c.** Prolateral. **b, d.** Dorsal.

smooth, with longitudinal row of lateral spinules; promargin of fang furrow with 6, retromargin with 4 large and 2 minute teeth. Sternum 1.09 long, 0.88 wide, sides weakly sinuate; labium 0.38 long, 0.31 wide; palpal coxa 0.63 long, 0.33 wide. Femur I length 1.63 times carapace width; metatarsus I (fig. 40a, b) weakly sinuate basally, with short, sharp retrodorsal spur at midsegment, distad of this a prolateral concavity and field of spinules on distal portion of concavity. Spination: palpus: femur d0-0-0-1; leg I: femur d0-0-1-0, p0-0-1-1, tibia p0-0-0-1, v0-0-2-0, r0-1-1-0, metatarsus p0-0-0-1, v1-1-2-1, r0-0-0-1; leg II: femur d1-1-00, p0-0-1-1, tibia p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-0-1, r0-1-0-1; leg III: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, tibia d1-0-10, p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-1-1, r1-1-0-2; leg IV: femur d0-0-1-1, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v2-1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-1-1, r1-1-0-2. Metatarsi III and IV with weak apical preening combs. Leg measurements:

	I	II	III	IV	Palp
Femur	2.19	1.69	1.44	2.01	0.75
Patella	0.81	0.69	0.56	0.69	0.31
Tibia	1.88	1.31	1.19	1.94	0.38
Metatarsus	2.06	1.41	0.81	1.81	—
Tarsus	0.94	0.81	0.47	0.94	0.57
Total	7.88	5.91	4.47	7.39	2.01

Palpal femur with row of 4 anterobasal thorns, distal 2 very stout; tibia (fig. 41b) with acutely

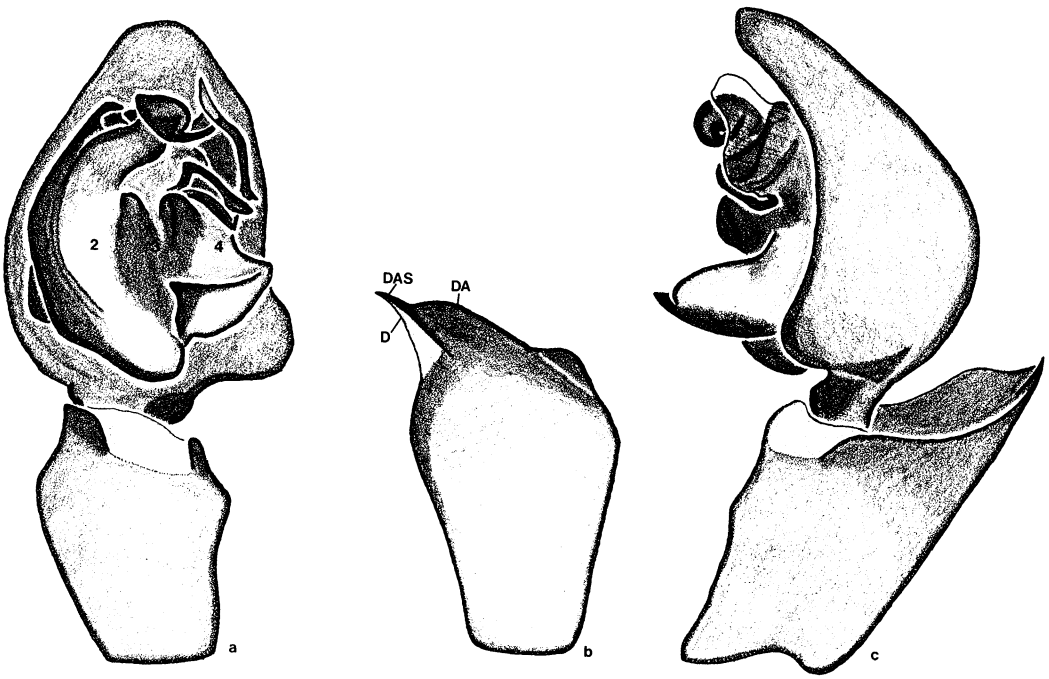

Fig. 41. *Xevioso colobata*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. D = dorsal tibial process; DAS = produced, sclerotized apex of DA; DA = anterodorsal tibial lobe. Numbers 1, 2, 3, 4 refer to sclerotized and desclerotized longitudinal sectors of palpal bulb.

pointed DAS, hyaline D process small, triangular, extending to DAS apex; palpal bulb (fig. 41a, c) with embolus short, base stout, making less than 1 turn; EBS small, bipartite with short EBA1 and elongate EBA2; tegulum with basal and retrobasal lobes, TA3a stout, conical; TA1 absent, TA3 and TA4 small, lobate; conductor with acutely pointed proximal flange, apical fringe present.

VARIATION: Total length 3.69–4.63; carapace length 1.37–1.55 times width, pars cephalica may be darkened anteriorly; thoracic fovea 0.19–0.22 length carapace; PER width 1.15–1.18 times AER, 2.33–2.75 times OAL; OQP 1.23–1.55 times OQA, 1.03–1.29 times OQL; cheliceral length 4.38–6.88 times clypeal height, promargin of fang furrow with 5 or 6 teeth; labium length 1.20–1.27 times width; femur I length 1.55–1.63 times carapace width; abdomen with ventral longitudinal light bands obscure or faint and narrow.

FEMALE: Unknown.

DISTRIBUTION: Drakensberg Mountains of the eastern Transvaal, South Africa (fig. 106).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Transvaal*: Drakensberg Mts., 12 mi W Klaserie, Mar. 29, 1958, elev. 1275 m (E. S. Ross & R. Leech, CAS), 2♂.

Xevioso lichmadina, new species

Figures 7b–d, 42a–c, 43a, c, 44a, b, 106

TYPES: Holotype male from beneath leaves at Haenertsburg, Transvaal, South Africa (Mar. 5, 1976; D. Hartwig), deposited in NCP; paratypes, same data, 1 male in AMNH, 1 male and 1 female in NCP.

ETYMOLOGY: The specific name is from the Greek *likmados*, a winnowing fan or basket, referring to the form of the palpal tibial process.

DIAGNOSIS: Male metatarsus I (figs. 7b, 44a, b) with broad, prolateral process at midsegment, distad of this segment with retrolateral kink forming prolateral concavity, apex of process and base of concavity lined with spinules (fig. 7c, d); palpal tibia (fig. 42b) with

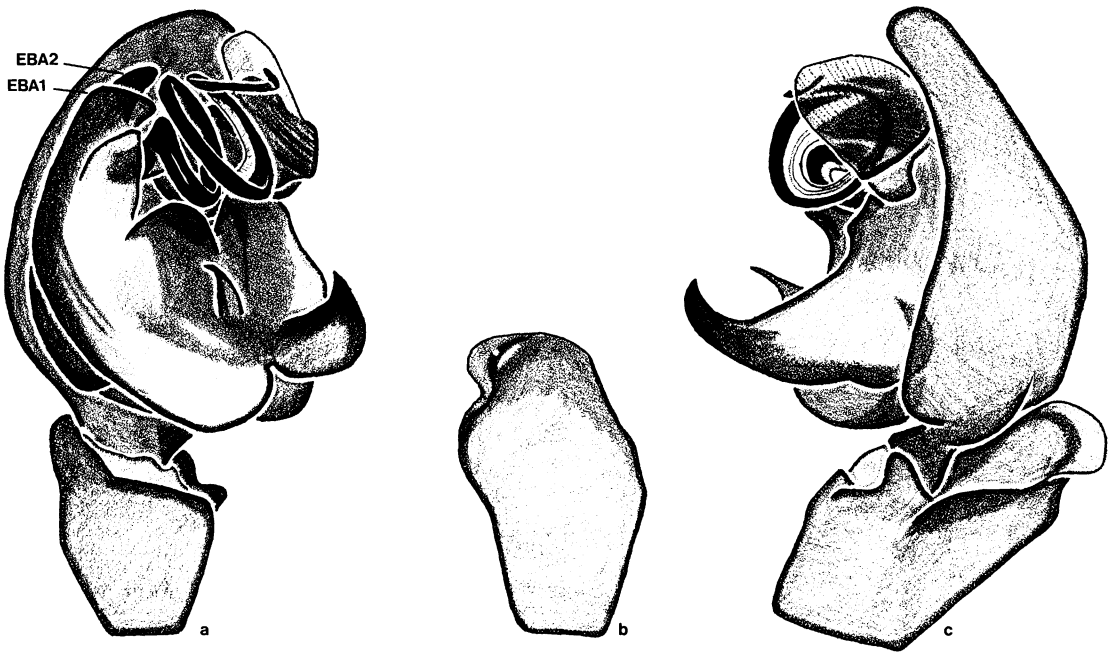

Fig. 42. *Xevioso lichmadina*, new species, holotype, male palpus. a. Tibia and tarsus, ventral. b. Tibia, dorsal. c. Tibia and tarsus, retrolateral. EBA1, EBA2 = distal divisions of basal embolic sclerite.

DA not produced, hyaline D process broad, margin curved; embolus (fig. 42a, c) a broad spiral of more than 2 turns, with broad lamella for most of length, base of conductor straight, without proximal flange; epigynum as in figure 43a, PML narrow, length greater than twice width, each spermatheca with large, hornlike bursa copulatrix, SSG translucent, apex lateral (fig. 43c).

MALE (holotype): Total length 4.25. Carapace yellow-brown, darker anteriorly, faintly dusky along lateral margin; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown; venter, palpi, and legs yellow-brown, unmarked except sternum with faint infuscations, and metatarsus I orange-brown; abdomen gray, unmarked. Carapace 1.97 long, 1.44 wide; thoracic fovea narrowed posteriorly, short, length 0.14 carapace; clypeus 0.14 high; ocular area 0.24 long, 0.53 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.33:1.22:1.44, diameter of PM 0.09; AM separated by ½ their diameter, separated from AL by ½ AM; PM separated by their diameter, separated from PL by ⅝ PM; lateral eyes separated by ⅐ PL. Chelicerae 0.86 long, smooth, with lateral longitudinal band of small spinules; promargin of fang furrow with 5, retromargin with 4 large and 2 minute teeth. Sternum 1.22 long, 0.94 wide, sides entire, apex pointed; labium 0.38 long, 0.33 wide; palpal coxa 0.63 long, 0.34 wide. Femur I length 1.65 times carapace width; metatarsus I (fig. 44a, b) with broad, prolateral process at midsegment, distad of this segment with retrolateral kink forming prolateral concavity, apex of process and base of concavity lined with spinules. Spination: leg I: femur d0-0-1-0, p0-0-1-1, r0-0-0-1, tibia p0-0-1-0, v1-0-2-2, r0-1-1-0, metatarsus p0-0-0-2, v2-1-0-1, r0-0-0-2; leg II: femur d1, p0-1-0-1, r0-0-0-1, tibia p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p0-1-0-2, v0-2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-0-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-0-0-2. Metatarsi II–IV with apical preening combs. Leg measurements:

	I	II	III	IV	Palp
Femur	2.38	1.88	1.63	2.31	0.88
Patella	0.81	0.72	0.69	0.78	0.34
Tibia	2.31	1.50	1.28	2.13	0.38
Metatarsus	2.31	1.63	1.50	2.19	—
Tarsus	1.25	1.00	0.75	0.94	0.81
Total	9.06	6.73	5.85	8.35	2.41

Palpal femur with anterobasal row of 3 thorns, distal two very stout; palpal tibia (fig. 42b) with DA blunt, not produced, hyaline D process broad, margin curved; palpal bulb (fig. 42a, c) with embolus slender, making a broad spiral of more than 2 turns with broad lamella for most of length; EBS bipartite, EBA1 rectangular, EBA2 slender, tapering apically; tegulum with basal and retrobasal lobes, TA1 long, slender; TA3a slender; base of conductor straight, without proximal flange, apical fringe present.

VARIATION: Total length 3.81–4.25; carapace length 1.35–1.37 times width; thoracic fovea 0.14–0.17 length carapace; PER width 1.14–1.25 times AER, 2.20–2.68 times OAL; OQP 1.23–1.50 times OQA, 1.07–1.29 times OQL; cheliceral length 6.00–7.00 times clypeal height; promargin of fang furrow with 4 or 5 teeth; sternum length 1.16–1.30 times width, apex pointed to blunt; labium length 1.14–1.27 times width; femur I length 1.65–1.71 times carapace width; abdomen with dorsum uniform gray or with faint, paired light marks, venter unmarked or with very faint longitudinal light bands.

FEMALE (20 km W Trichardtsdal): Total length 5.75. Markings of cephalothorax, legs, and palpi as in male, except darker; abdomen dark gray with slightly paler anterodorsal area, venter with pair of thin, longitudinal bands, between these pale gray. Carapace 2.44 long, 1.75 wide; thoracic fovea as in male, 0.17 length carapace; clypeus 0.19 high; ocular area 0.26 long, 0.75 wide; ratio of eyes AM:AL: PM:PL, 1.18:1.27:1.00:1.27, diameter of PM 0.09; AM separated by ½ their diameter, separated from AL by ⅘ AM; PM separated by 1½ times their diameter, separated from PL by 1⅔ PM; lateral eyes separated by 1/7 PL. Chelicerae 1.17 long, with lateral longitudinal band of spinules; pro- and retromargins of fang furrow with 5 teeth. Sternum 1.22 long, 0.94 wide, apex blunt; labium 0.38 long, 0.33 wide; palpal coxa 0.63 long, 0.34 wide. Femur I length 1.32 times carapace width. Spination: palpus: femur d0-0-1-1, patella p0-1-0, tibia d0-0-1, p0-1-1-0, tarsus p0-1-1-0, v0-1-3-2, r0-1-1-0; leg I: femur d0-0-1-0, p0-0-1-0, tibia p0-0-1-0, v1-1-0-2, metatarsus p0-0-0-1, v2-1-1-1, r0-0-0-1; leg II: femur d1-1-0-0, p0-0-0-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p0-1-0-2, v2-2-2, r0-1-0-2; leg III: femur d0-1-1-0, p0-0-0-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v1-1-0-2, r0-0-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-0-0-2. Metatarsi II–IV with apical preening combs. Palpal femur with anterobasal row of 3 thorns, distal 2 very stout. Calamistrum origin 0.43 from metatarsus base, length 0.31 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.31	1.94	1.56	2.25	1.00
Patella	0.88	0.72	0.69	0.81	0.34
Tibia	2.06	1.38	1.75	1.88	0.50
Metatarsus	1.94	1.50	1.25	1.81	—
Tarsus	1.00	0.88	0.75	0.88	0.88
Total	8.19	6.42	6.00	7.63	2.72

Epigynum as in figure 43a, PML very narrow, length greater than twice width, each spermatheca (fig. 43c) with large, hornlike bursa copulatrix, SSG translucent, apex lateral; spermathecal chamber cylindrical, with internal spiral of 4 or 5 turns, efferent duct leading posteriad from apical bulb, fertilization duct extending around and along ventral margin of bursa copulatrix.

VARIATION: Total length 4.06–5.75; carapace length 1.39–1.49 times width; thoracic fovea 0.14–0.17 length carapace; PER width 1.17–1.23 times AER, 2.69–2.94 times OAL; OQP 1.31–1.50 times OQA, 1.24–1.42 times OQL; cheliceral length 6.08–6.25 times clypeal height, retromargin of fang furrow with 5 or 6 teeth; sternum length 1.19–1.24 times width; labium length 0.91–1.23 times width; femur I length 1.32–1.43 times carapace width.

DISTRIBUTION: Strydpoortberg and northernmost Drakensberg Mountains, Transvaal Province, South Africa (fig. 106).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Transvaal*: 21 km W Tri-

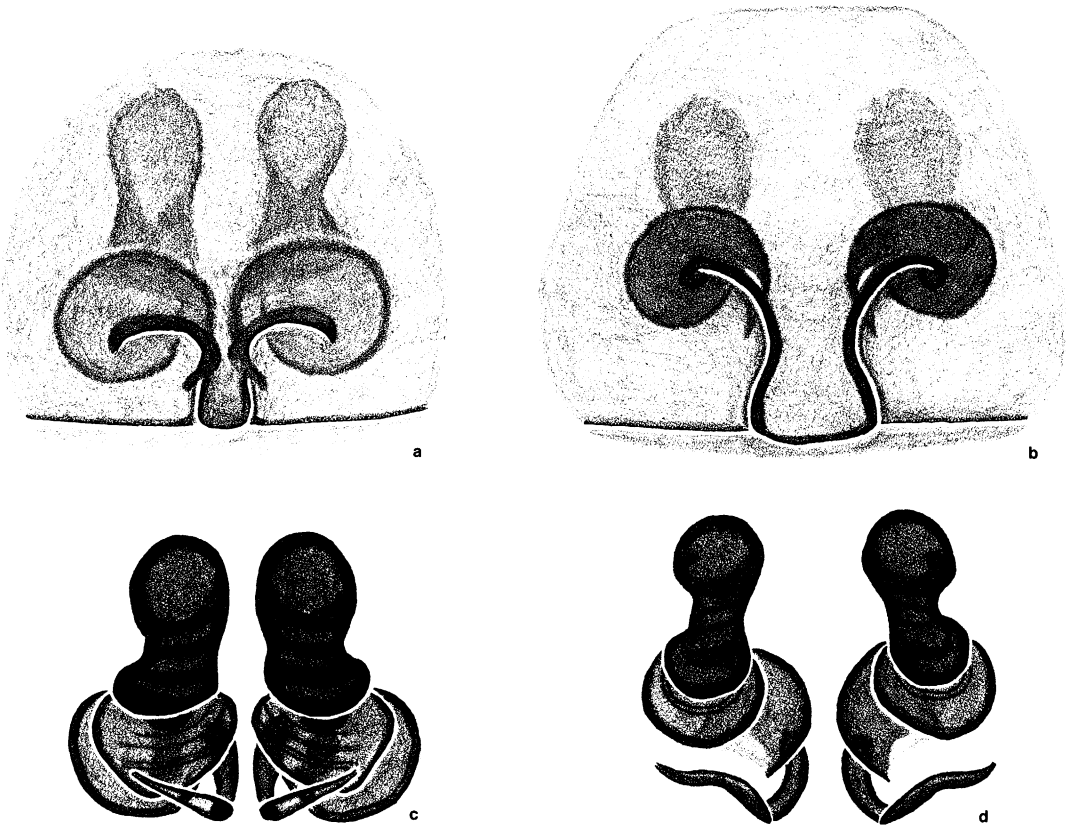

Fig. 43. *Xevioso* spp., female genitalia. a, c. *lichmadina*, new species. a. Haenertsburg. c. Trichardtsdal. b, d. *kulufa*, new species, Tzaneen. **a, b.** Epigyna, ventral. **c, d.** Spermathecae, dorsal.

chardtsdal, Dec. 23, 1985, from forest litter in riverine forest, elev. 940 m (S. &. J. Peck, AMNH), 2♀.

Xevioso kulufa, new species

Figures 43b, d, 44c, d, 45a–c, 106

TYPES: Holotype male from Hanglip Forest, Soutpansberg District, Transvaal, South Africa (Aug. 1960; N. Leleup), deposited in MRAC.

ETYMOLOGY: The specific name is from the Zulu *isikulufo*, or screw.

DIAGNOSIS: Male metatarsus I (fig. 44c, d) with median kink forming weak prolateral process, distal to this a prolateral concavity, base and apex of process and concavity lined with fine spinules; palpal tibia (fig. 45b) with hyaline D process broad, margin with retrolateral angle; embolus (fig. 45a) making broad spiral of more than 2 turns, with narrow lamella for most of length; tegulum with basal and retrobasal lobes, with swollen desclerotized area near base of TA3a; base of conductor with acutely pointed proximal flange (fig. 45c); epigynum as in figure 43b, PML narrow, length greater than width; each spermatheca (fig. 43d) with large, hornlike bursa copulatrix, encircled by slender SSG with lateral bulb.

MALE (holotype): Total length 6.06. Carapace orange-brown, pars cephalica darkened anteriorly, margin dusky; black pigment surrounding each eye and extending between AM and between lateral eyes; carapace dark red-brown; labium and palpal coxa red-brown, sternum, legs, and palpi orange-brown, unmarked; abdomen dark gray, dorsum with anterior light area, broken into diffuse pos-

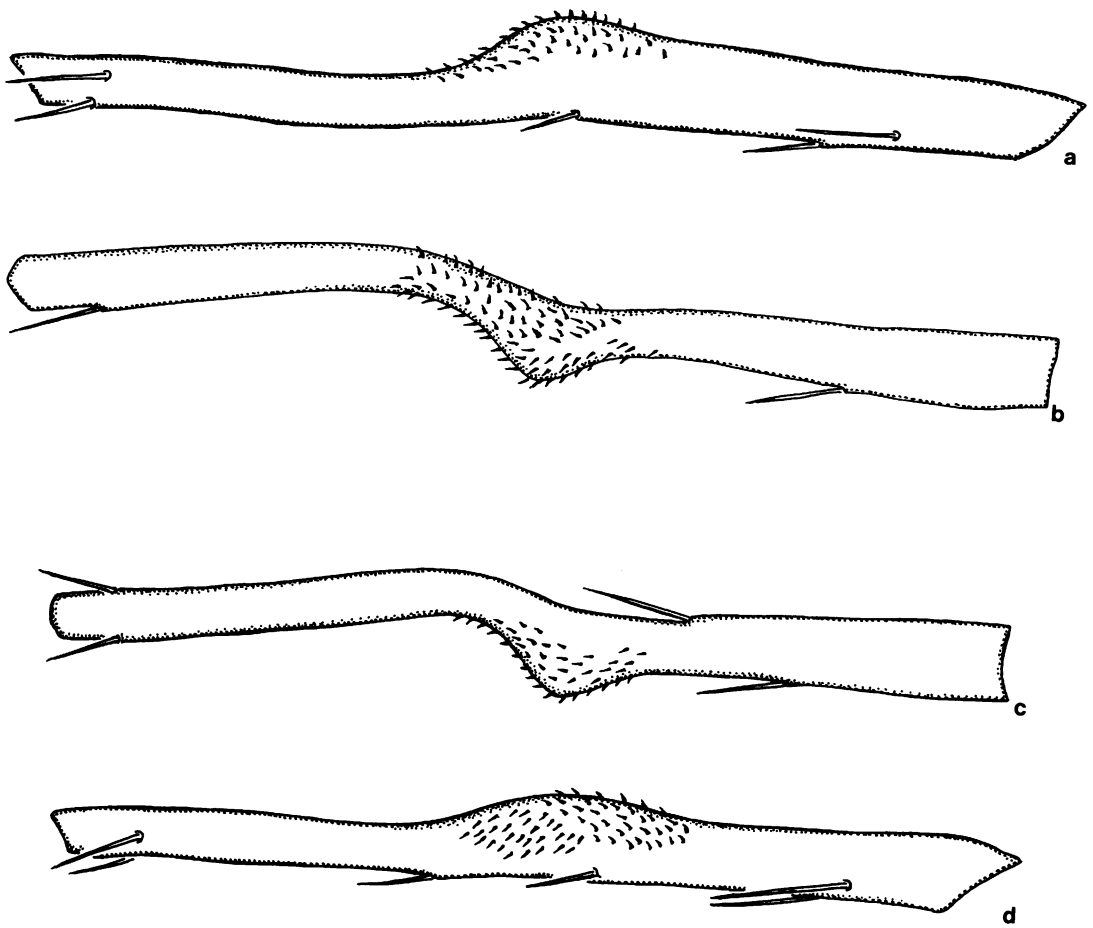

Fig. 44. *Xevioso* spp., right male metatarsi I. a, b. *lichmadina*, new species, paratype. c, d. *kulufa*, new species, holotype. **a, d.** Prolateral. **b, c.** Dorsal.

terodorsal chevrons; venter with bold, light longitudinal bands, area between these pale. Carapace 3.09 long, 2.44 wide; thoracic fovea long, deep, narrowed posteriorly, length 0.19 carapace width; clypeus 0.26 high. Ocular area 0.38 long, 0.94 wide, PER slightly procurved; ratio of eyes AM:AL:PM:PL, 1.00:1.54:1.38: 1.38, diameter of PM 0.14; AM separated by ¾ their diameter, separated from AL by 1½ AM; PM separated by 1⅙ their diameter, separated from PL by 1⅓ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 1.55 long, slender, with fine anterior wrinkles, weak ventrolateral striae near cheliceral base and lateral longitudinal band of spinules; promargin of fang furrow with 5, retromargin with 2 minute, 2 large, and 2 minute teeth. Sternum 1.72 long, 1.39 wide, apex blunt; labium 0.66 long, 0.53 wide; palpal coxa 1.03 long, 0.47 wide. Femur I length 1.51 times carapace width; metatarsus I (fig. 44c, d) with median kink forming weak prolateral process, distal to this prolateral concavity, base and apex of process and concavity lined with fine spinules; legs otherwise unmodified. Spination: leg I: femur d0-1-0-0, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p0-0-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-1-0-1, r0-0-0-1, tibia p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-1-0-1, r0-1-0-1, tibia d0-0-1-0, p0-1-1-0, v1-1-0-2, r1-0-1-1, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-

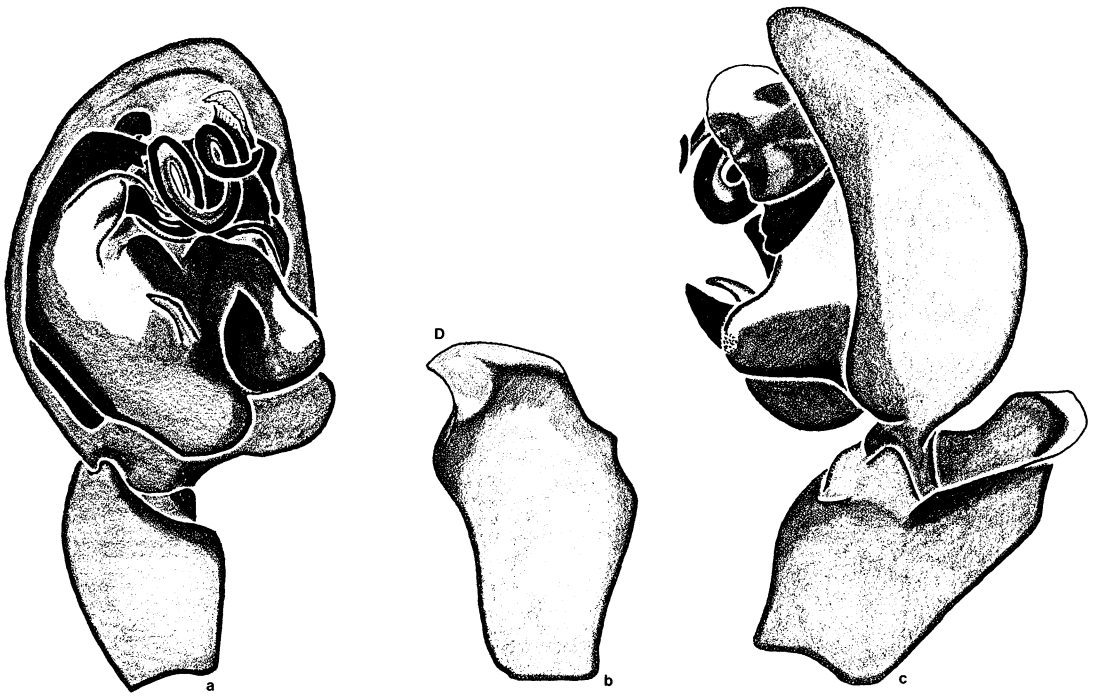

Fig. 45. *Xevioso kulufa*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. D = dorsal tibial process.

2-1, r1-0-1-2. Well-developed preening combs at apices of metatarsi II–IV. Leg measurements:

	I	II	III	IV	Palp
Femur	3.69	3.00	2.69	3.31	1.69
Patella	1.31	1.13	1.13	1.19	0.63
Tibia	3.31	2.31	1.94	2.94	0.56
Metatarsus	3.44	2.56	2.31	3.13	—
Tarsus	1.69	1.31	1.13	1.38	1.13
Total	13.44	10.31	9.20	11.95	4.01

Palpal femur with row of 3 anterobasal thorns, apical 2 very stout; palpal tibia (fig. 45b) with hyaline D process broad, margin with retrolateral angle; palpal bulb (fig. 45a, c) with embolus making broad spiral of more than 2 turns, with narrow lamella for most of length; EBS bipartite, EBA1 rectangular, EBA2 slender; tegulum with basal and retrobasal lobes, TA1 long, very slender, TA3a stout, conical, with swollen desclerotized area near base of TA3a, TA2 and TA4 weak lobes; base of conductor with acutely pointed proximal flange, apical fringe present.

FEMALE (Tzaneen): Total length 9.50. Carapace orange-brown, pars cephalica shading to red-brown anteriorly, with dark, sclerotized radii on pars thoracica and along margin of pars cephalica; black pigment surrounding each eye; chelicerae dark red-brown, boss yellow-brown; labium and palpal coxa dark red-brown, sternum, trochanters, legs, and palpi yellow-brown, unmarked except palpal tarsus, metatarsus and tarsus I red-brown; abdomen gray-brown, dorsum with anterior pale area and posterior faint chevrons, venter with 2 short, longitudinal bands, area between these pale yellow-brown. Carapace 4.75 long, 3.34 wide, pars cephalica domed; thoracic fovea length 0.18 carapace; clypeus 0.53 high; ocular area 0.50 long, 1.52 wide; ratio of eyes AM:AL:PM:PL, 1.08:1.04:1.00:1.00, diameter of PM 0.19; AM separated by ½ their diameter, separated from AL by AM diameter; PM separated by 1½ their diameter, separated from PL by 1½ PM; lateral eyes separated by ¼ PL. Chelicerae 1.31 long, with longitudinal group of lateral spinules; promargin of fang furrow with 6, retromargin with 4 large and 2 minute teeth.

Sternum 2.47 long, 1.91 wide, apex a right angle; labium 1.06 long, 0.75 wide; palpal coxa 1.63 long, 0.88 wide. Femur I length 1.51 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-1, p0-1-0, tibia p0-1-1-0, tarsus p0-1-1-0, v1-1-1-2-2-2, r1-0-0; leg I: femur d0-0-1-0, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-1-1-1, r0-1-0-0, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-0-0, r0-1-0-0, patella d1-0-1-0, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-1-0, r1-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-1-0, r1-0-1-2. Metatarsi II–IV with well-developed apical preening combs. Palpal femur with row of 3 anterobasal thorns, apical 2 very stout. Calamistrum origin at 0.41 from metatarsus base, length 0.34 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	5.06	4.00	3.38	4.25	1.89
Patella	1.81	1.43	0.81	1.00	0.81
Tibia	4.63	3.19	2.56	3.56	1.06
Metatarsus	4.56	3.38	2.94	3.81	–
Tarsus	2.06	1.63	1.44	1.69	1.94
Total	18.12	13.63	11.13	14.31	5.70

Epigynum as in figure 43b, PML very narrow, length greater than width, each spermatheca with large, hornlike bursa copulatrix, encircled by slender, translucent SSG with lateral bulb (fig. 43d); spermathecal chamber cylindrical, with internal spiral of 4 or 5 turns, efferent duct leading posteriad from apical bulb; fertilization duct extending around and along ventral margin of bursa copulatrix.

NATURAL HISTORY: Label data suggest that this species occurs in montane forest.

DISTRIBUTION: Soutpansberg and northern Drakensberg Mountains, Transvaal, South Africa (fig. 106).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Transvaal*: 15 mi W Tzaneen, Mar. 27, 1958, elev. 1250 m (E. S. Ross & R. E. Leech, CAS), 1♀.

Xevioso jocquei, new species

Figures 46a–c, 47e, f, 106

TYPE: Male holotype from the Lichenya Plateau at 2000 m on Mt. Mulanje, Southern Province, Malawi (Nov. 7–23, 1981; R. Jocqué), deposited in the MRAC.

ETYMOLOGY: The specific name is a patronym in honor of the collector of the holotype.

DIAGNOSIS: Leg I unmodified (fig. 47e, f); tegulum simple (fig. 46a), not divided into basal and retrobasal lobes, embolus broad at base, with slender apical spiral, EBS tripartite, TA3a absent, tegulum with retrolateral bifid process (fig. 46c).

MALE (holotype): Total length 6.67. Carapace with pars thoracica orange-brown, dark along margin, with short, dark radial markings anterolaterally, laterally, and posterolaterally; pars cephalica shading to red-brown anteriorly, dusky along margin, with short, dusky, v-shaped mark anteriad of thoracic fovea and faint reticulations laterad of ocular area; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown, boss orange-brown; labium and palpal coxa red-brown, lighter at tips, sternum, coxae, and trochanters orange-brown with dusky markings; legs orange-brown, suffused with faint dusky pigment; abdomen dark gray, dorsum with pale cardiac mark, venter with pair of narrow, broken longitudinal bands. Carapace 3.00 long, 2.12 wide, margin nearly entire; thoracic fovea narrowed posteriorly, length 0.15 carapace; clypeus 0.26 high; ocular area 0.31 long, 0.86 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.25:1.00:1.17, diameter of PM 0.12; AM separated by ⅓ their diameter, separated from AL by ⅔ AM; PM separated by their diameter, separated from PL by 1⅓ PM; lateral eyes nearly contiguous. Chelicerae 1.58 long, robust, with fine lateral striae, longitudinal group of short spinules along lateral margin; promargin of fang furrow with 3, retromargin with 2 large and 2 minute teeth. Sternum 1.60 long, 1.28 wide, margin sinuate, apex a right angle; labium 0.64 long, 0.52 wide; palpal coxa 1.04 long, 0.52 wide. Femur I length 1.45 times carapace width; metatarsus I with weak prolateral concavity just distad of middle (fig. 47e, f). Spination: leg I: femur d0-0-1-0, p0-0-0-1-1, tibia p0-1-1-0, v0-0-2-2, metatarsus p0-1-0-0, v2-1-0-1, r0-0-0-1; leg II (absent); leg III: femur d0-1-1-0, p0-1-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-

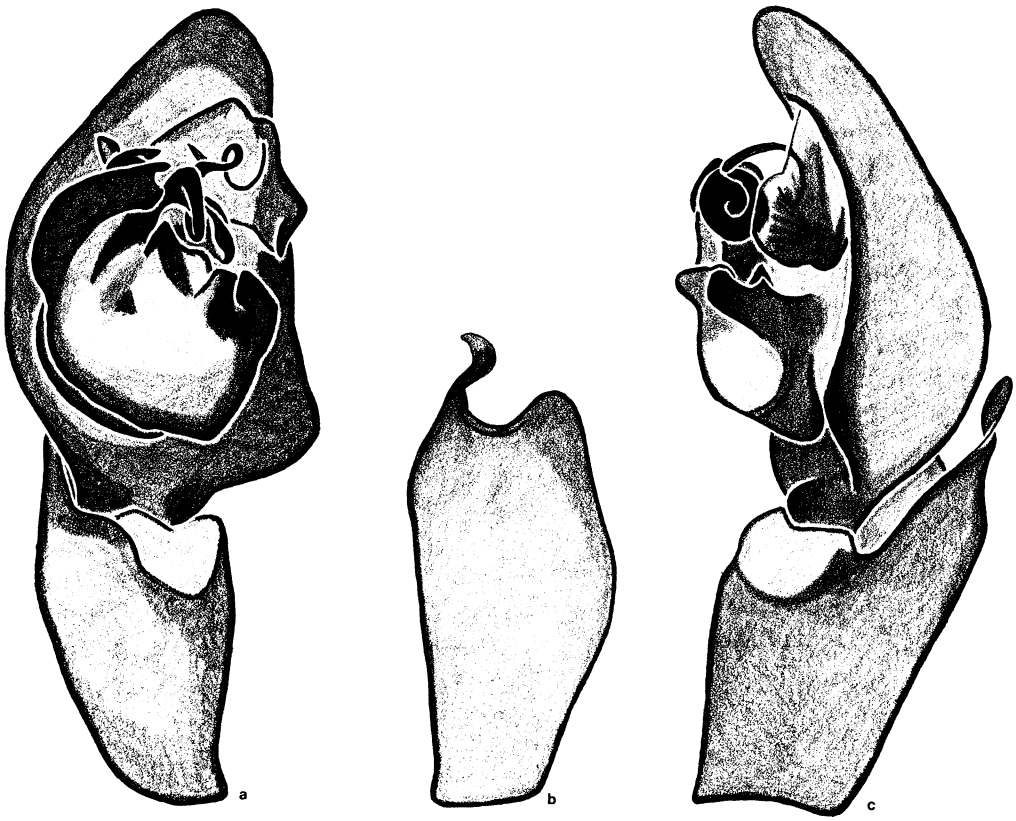

Fig. 46. *Xevioso jocquei*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

0-0-0, r0-0-0-1, tibia p0-0-1-0, v1-1-0-2, r1-1-0-2, metatarsus p1-1-0-2, v2-1-0-1, r1-0-0-2. Well-developed prolateral and retrolateral preening combs at apices of metatarsi III and IV. Leg measurements:

	I	II	III	IV	Palp
Femur	3.08	—	2.25	2.92	1.25
Patella	1.25	—	0.75	1.00	0.54
Tibia	2.75	—	1.58	2.42	0.50
Metatarsus	2.58	—	1.75	2.42	—
Tarsus	1.25	—	0.96	1.08	0.92
Total	10.91	—	7.29	9.84	3.21

Palpal femur with 2 stout anterobasal thorns; tibia (fig. 46b) with elongate, distally curved hyaline apical D process and reduced DA; palpal bulb (fig. 46a, c) with tegulum simple, not divided into basal and retrobasal lobes, embolus broad at base, with slender apical spiral; EBS tripartite, EBA1 lobate, EBA2 and EBA3 slender, EBA2 recurved; TA1 and TA3a absent, tegulum with retrolateral bifid process of uncertain homology (but probably TA2), TA4 lobate; conductor with lateral and median proximal flanges, apical fringe absent.

FEMALE: Unknown.

DISTRIBUTION: Known only from the type locality on Mt. Mulanje in southern Malawi (fig. 106).

NOMEN DUBIUM

Xevioso stolida (Simon)

Themacrys stolida Simon, 1906: 288 (male holotype from Zululand, South Africa, MNHN, not examined). – Bonnet, 1959: 4421.
Themarcys (lapsus) *stolida*: Roewer, 1954: 1379.
Xevioso stolida: Lehtinen, 1967: 275.

NOTE: The type of *Themacrys stolida* Simon was not available for study as it was lent to Lehtinen in the 1960s and has never been returned. The species is not recognizable from the very brief original description.

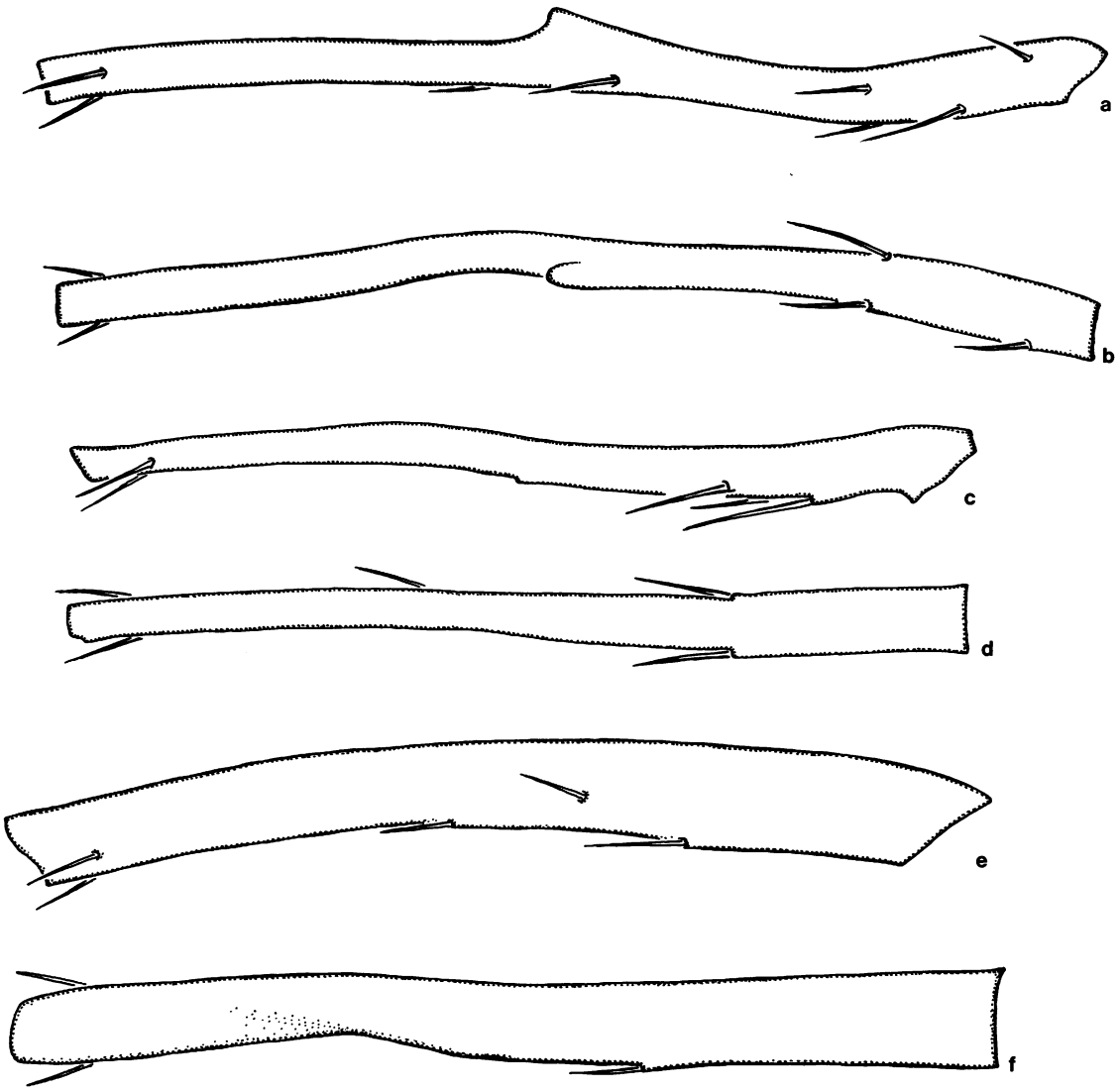

Fig. 47. *Xevioso* spp., right male metatarsi I. a, b. *amica*, new species, paratype. c, d. *orthomeles*, new species, holotype. e, f. *jocquei*, new species, holotype. **a, c, e.** Prolateral. **b, d, f.** Dorsal.

PHYXELIDINI, NEW TRIBE

Type genus *Phyxelida* Simon, 1894b: 64.

DIAGNOSIS: The Phyxelidini may be distinguished from other Phyxelidinae by having the conductor with a marginal groove (figs. 60e, 67a) in which the embolus lies for most of its length, the pars pendula readily separated from the embolus and developed as an elongate, flexible lamella which is associated with the embolus for most of its length (fig. 9).

NAMAQUARACHNE, NEW GENUS

TYPE SPECIES: *Namaquarachne khoikhoiana*, new species.

ETYMOLOGY: The generic name refers to the occurrence of these spiders in Namaqualand, South Africa, and is feminine in gender.

DIAGNOSIS: Dorsal process (D) of palpal tibia with apical, dorsoventral knob (fig. 49a, b); epigynum with posteromedian, anterior-directed pocket (PMP) (fig. 49d).

DESCRIPTION: Medium size spiders (fig.

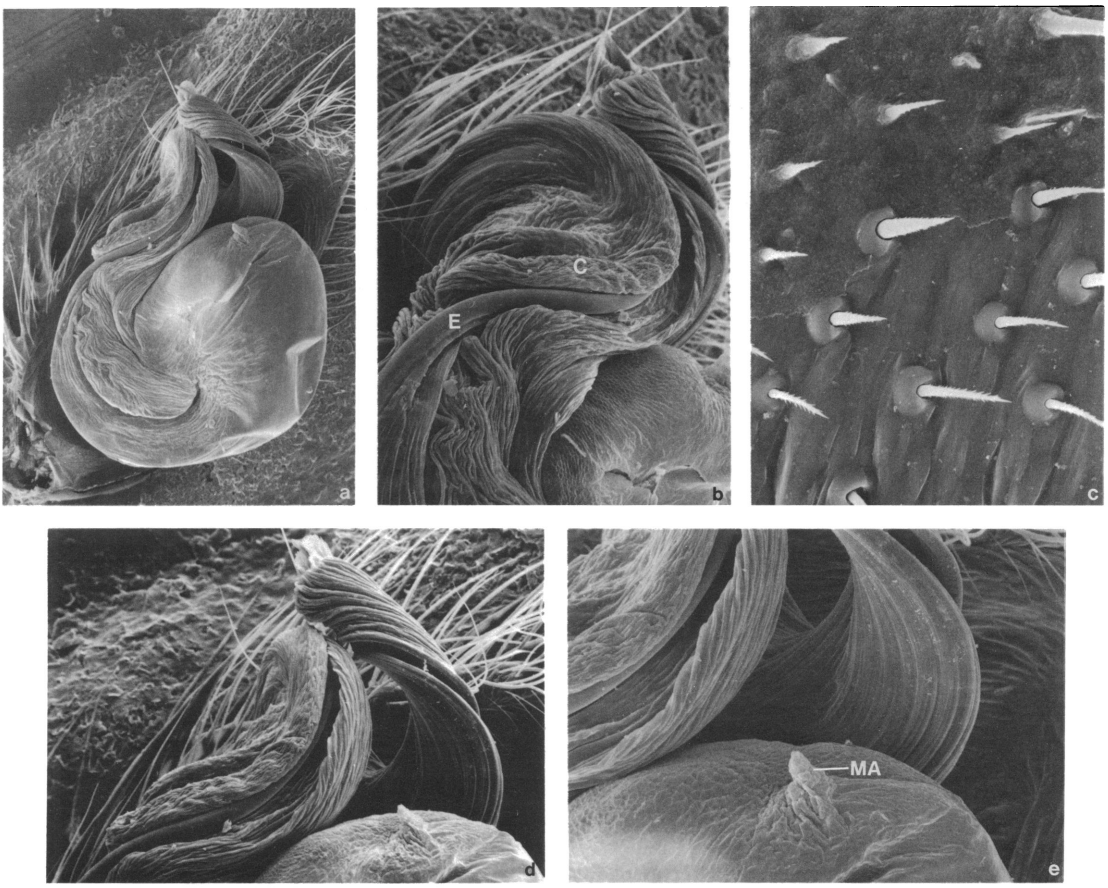

Fig. 48. *Namaquarachne tropata*, new species, Grootvadersbosch, male. **a, b, d, e.** Palpal bulb, ventral. **c.** Chelicera, basoventral spinules. E = embolus; C = conductor; MA = median apophysis.

52a), total length 5.5 to 10.5 mm. Body sparsely setose. Carapace length 1.26–1.49 times width; thoracic fovea usually deep, narrowed at least posteriorly, length 0.09–0.18 times carapace length; AER slightly recurved, PER straight; ocular area width 2.45–3.65 times length; clypeal height 1.50–4.00 times AM diameter; cheliceral length 2.63–8.33 times clypeal height, chelicerae nearly smooth to deeply wrinkled ventrally (fig. 49c), promargin of fang furrow with 4–7 teeth, retromargin with 5–8 teeth, always with combination of large and minute teeth on retromargin. Sternum long, length 1.24–1.39 times width, narrowed anteriorly, apex blunt to acutely pointed; labium usually broad, length 0.91–1.23 times width. Leg formula 1423 or 1(4 = 2)3, legs uniformly marked to weakly annulate; femur I length 1.27–1.67 times carapace width; metatarsi without apical combs; male metatarsus with retrolateral clasping spine (fig. 54a–f); origin of calamistrum at 0.35–0.41 distance from metatarsus base, length 0.33–0.40 metatarsus length, may have poorly-defined pseudocalamistrum. Abdomen with ventral longitudinal bands narrow to broad. Palpal femur with straight row of 3 or 4 stout anterobasal thorns (fig. 5a, b), may be basal group of minute thorns. Male palpal tibia with single, dorsomedian D process, apex of process with dorsoventral knob (fig. 49a, b), anterodorsal DA and retrodorsal R sectors usually weakly produced (fig. 51b). Palpal bulb with tegulum (figs. 48a, 51c) swollen, semispherical, with or without small apical median apophysis (MA) (fig. 48e); embolic origin basal to prolateral, embolus slender, elongate, with accompanying de-

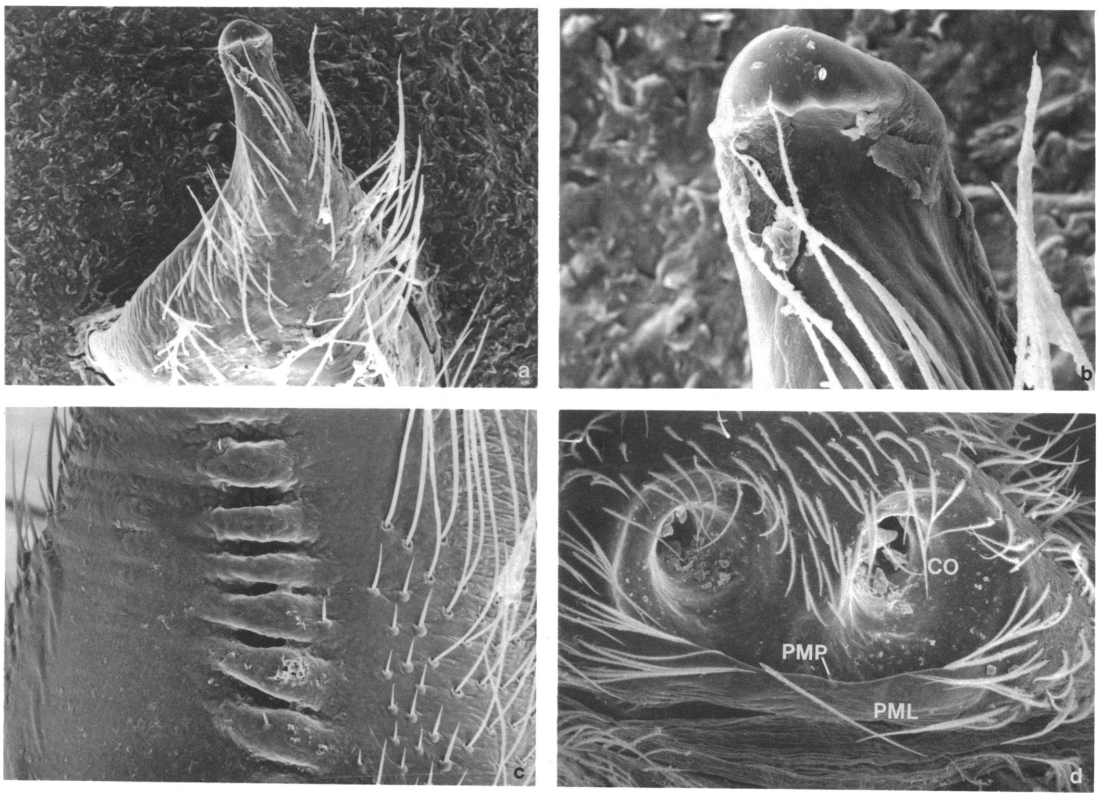

Fig. 49. *Namaquarachne tropata*, new species, Grootvadersbosch. **a.** Male palpal tibia, dorsal. **b.** Apex of dorsal process of male palpal tibia. **c.** Ventral striae of male chelicerae. **d.** Female epigynum, ventral. CO = copulatory opening; PMP = posterior median pocket; PML = posterior median lobe of epigynum.

tached lamellar pars pendula for most of length; apex of embolus surrounded and hidden by grooved apical conductor (fig. 48b, d). Epigynum with copulatory openings median to anterolateral, posterior median lobe (PML) with posteromedian, anterior-directed pocket (PMP) (fig. 49d); spermatheca (fig. 12f, g) with large, translucent copulatory chamber emptying into blind, ending bulb, spermathecal tubes convoluted, fertilization duct posterior. Spinnerets as in figures 2a–d, 56a–f.

COMPOSITION: Five species. Relationships among the species are depicted on the cladogram in figure 50.

DISTRIBUTION: Southwestern Cape Province, South Africa, extending northward through Namaqualand nearly to the Orange River (fig. 107).

Namaquarachne angulata, new species

Figures 12f, 57b, e, 107

Auximus hottentottus: Purcell, 1908 (part): 216 (misidentification, not *hottentottus* Pocock, 1900).

NOTE: Purcell (1908: 217) mentioned this female specimen, which he identified as *Auximus hottentottus* Pocock, but included no description, illustration, or indication. Lehtinen (1967) examined this specimen and considered it to be distinct from *hottentottus* Pocock. He proposed the name *Matundua trifoveata* for it (Lehtinen, 1967: 247) and illustrated the epigynum (Lehtinen, 1967: fig. 395), but provided no description, diagnosis, or indication. Lehtinen's name meets none of the criteria for availability under Article

13 of the International Code of Zoological Nomenclature, and therefore I concur with the opinion of Brignoli (1983: 528) that *trifoveata* Lehtinen is a nomen nudum.

TYPE: Holotype female from Kamaggas, Klein Namaqualand, Cape Province, South Africa (July 1904; L. Schultze), deposited in the ZMB.

ETYMOLOGY: The specific name is from the Latin *angulus*, meaning corner or angle, referring to the many-angled epigynum.

DIAGNOSIS: Anterior margin of epigynum (fig. 57b) with posterior-directed, triangular projection; anterior margin of PMP angled in center, with lateral, anterior-directed points; copulatory openings lateral (fig. 57e), anterior loop of spermatheca narrow, longitudinal (fig. 12f).

FEMALE (holotype): Total length 9.75. Carapace orange-brown, pars cephalica dusky along lateral margin, with short, anteromedian, median and posteromedian dusky radii; margin of pars cephalica with broad, dusky band extending anteriad from thoracic fovea; pars cephalica with dark, anterolateral reticulate markings and fine, reticulate markings extending anteriad from margin to each posterior eye; black pigment surrounding each eye and extending between AM and between lateral eyes; clypeus dusky; chelicerae red-brown, with faint basal reticulations; sternum, labium and palpal coxa dusky orange-brown, leg coxae yellow-brown with broad dusky maculations; trochanters, legs and palpi yellow-brown, palpal tarsus and metatarsus-tarsus I orange-brown. Legs with broad, dusky annuli: femora I–IV with median and subapical, patellae I–IV with apical, tibiae II–IV with median and apical, and metatarsi III and IV with apical. Abdomen gray-brown, markings obscure, dorsum with anteromedian light mark and posterior light mottling, venter with pair of fine, broken longitudinal light bands. Carapace 3.88 long, 3.00 wide, margin weakly sinuate; thoracic fovea deep, narrowed posteriorly, length 0.12 carapace; clypeus 0.42 high; ocular area 0.43 long, 1.26 wide, PER slightly procurved; ratio of eyes AM:AL:PM:PL, 1.00:1.11:1.11:1.20, diameter of PM 0.16; AM separated by their diameter, separated from AL by 1¼ AM diameter; PM separated by 1⅔ their diameter, separated from PL by 1⅘ PM; lateral eyes separated by ⅓ PL. Chelicerae 1.84 long, smooth, promargin of fang furrow with 4 teeth, retromargin with 4 large teeth and 1 minute tooth. Sternum 2.38 long, 1.78 wide, apex pointed; labium 0.72 long, 0.72 wide; palpal coxa 1.22 long, 0.69 wide. Femur I length 1.52 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p0-0-1-1, v0-1-2-3-2; leg I: femur d1-1-0-0, p0-1-1-1, r0-0-1-0, tibia p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-

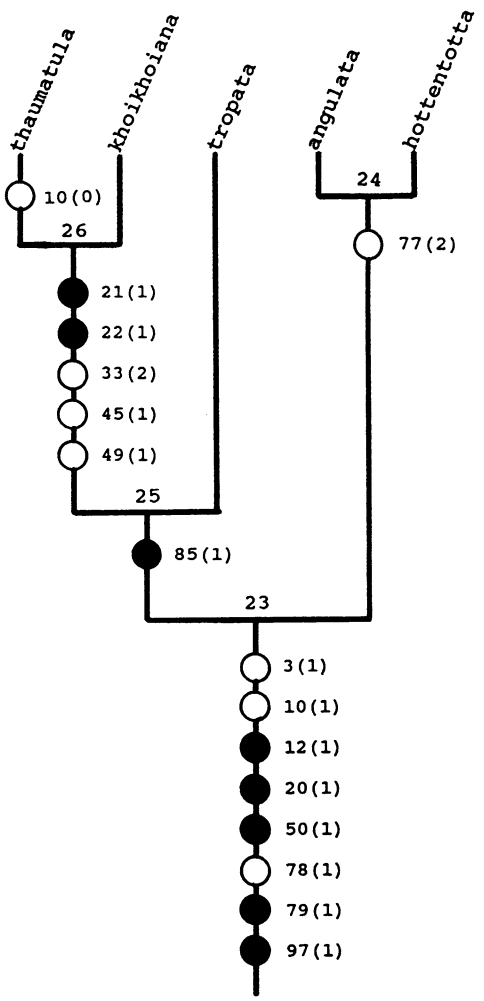

Fig. 50. Cladogram for the species of *Namaquarachne* (shaded circles: unique synapomorphies; open circles: homoplasy).

1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-0-0, patella d0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-1-1, r1-0-0-2. Palpal femur with row of 4 stout anterobasal thorns, distal 2 largest. Calamistrum origin at 0.35 from metatarsus base, length 0.37 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.56	3.56	3.25	4.19	1.50
Patella	1.75	1.50	1.25	1.56	0.75
Tibia	4.06	2.75	2.31	3.50	1.50
Metatarsus	4.25	2.94	2.63	3.56	–
Tarsus	1.81	1.44	1.25	1.44	1.50
Total	16.43	12.19	10.69	14.25	5.25

Epigynum as in figure 57b, anterior margin with posterior-directed, triangular projection; copulatory openings lateral, broadly longitudinal; central trapezoidal depression extending posteriad to PMP; anterior margin of PMP angled in center, with lateral, anterior-directed points; spermathecae as in figures 12f and 57e, each spermatheca with narrow, longitudinal anterior dorsal loop and with ventral tube leading to posterior chamber and fertilization duct.

MALE: Unknown.

DISTRIBUTION: Known only from the type locality in Namaqualand, Cape Province, South Africa (fig. 107).

Namaquarachne thaumatula, new species

Figures 51a–c, 52d, e, 54c, d, 107

Auximus hottentottus: Purcell, 1908 (part): 216 (misidentification, not *hottentottus* Pocock, 1900).

Matundua silvatica: Lehtinen, 1967: 247, 456, fig. 385 (misidentification, not *silvaticus* Purcell, 1904).

TYPES: Holotype male and 3 paratype females from Steinkopf, Klein Namaqualand, Cape Province, South Africa (July 1904; L. Schultze), deposited in the ZMB.

ETYMOLOGY: The specific name is from the Greek *thaumatos*, or a marvel, referring to the occurrence of a phyxelidine in the arid regions of northern Namaqualand.

DIAGNOSIS: Male palpus (fig. 51a) with apex of conductor a rounded lobe; apical knob of palpal tibial D process clavate, dorsoventral length as long as process (fig. 51c); metatarsus I (fig. 54c, d) with large retrolateral submedian process surmounted by stout clasping spine, distad of this segment slightly sinuate, weakly narrowed and then expanded to midsegment, this area lined with very fine retrolateral and prodorsal spinules; male chelicerae with broad, shallow ventral wrinkles; epigynum (fig. 52d) with PMP broad, at least ½ PML width, copulatory openings large, anterolateral, longitudinal, with ventral rim lateral and dorsal rim median.

MALE (holotype): Total length 7.75. Specimen faded; carapace yellow-white, slightly darker along margin and with faint anterolateral, lateral, and posterolateral radii; pars cephalica dusky along margin, with short, broad, dusky, v-shaped mark anteriad of thoracic fovea; black pigment surrounding each eye and extending between AM, between AM and PM, and between lateral eyes; chelicerae orange-brown; sternum dusky yellow-white, labium, coxae, trochanters, legs and palpi yellow-white, femora to tibiae II–IV with faint subapical dusky annuli, metatarsus I red-brown; abdomen yellow-white, dorsum with anteromedian pair of longitudinal dark markings and 5 pairs of median and posteromedian dark spots, spots confluent posteriorly; sides with longitudinal dark mottling, venter with pair of bold, longitudinal light bands, between these gray-brown with light longitudinal markings. Carapace 3.68 long, 2.72 wide; thoracic fovea deep, narrow, 0.18 carapace length; clypeus 0.30 high; ocular area 0.40 long, 0.98 wide; ratio of eyes AM:AL:PM:PL, 1.07:1.00:1.13:1.07, diameter of PM 0.17; AM separated by ½ their diameter, separated from AL by ½ AM; PM separated by their diameter, separated from PL by PM diameter; lateral eyes nearly contiguous. Chelicerae 1.54 long, with broad, shallow ventral wrinkles, pro- and retromargins of fang furrow with 3 small and 3 large teeth. Sternum 2.04 long, 1.52 wide, margin sinuate, apex acutely pointed; labium 0.60 long, 0.56 wide; palpal coxa 1.08 long, 0.60 wide. Femur I length 1.63 times carapace width; metatarsus I (fig. 54c, d) with large retrolateral submedian process surmounted

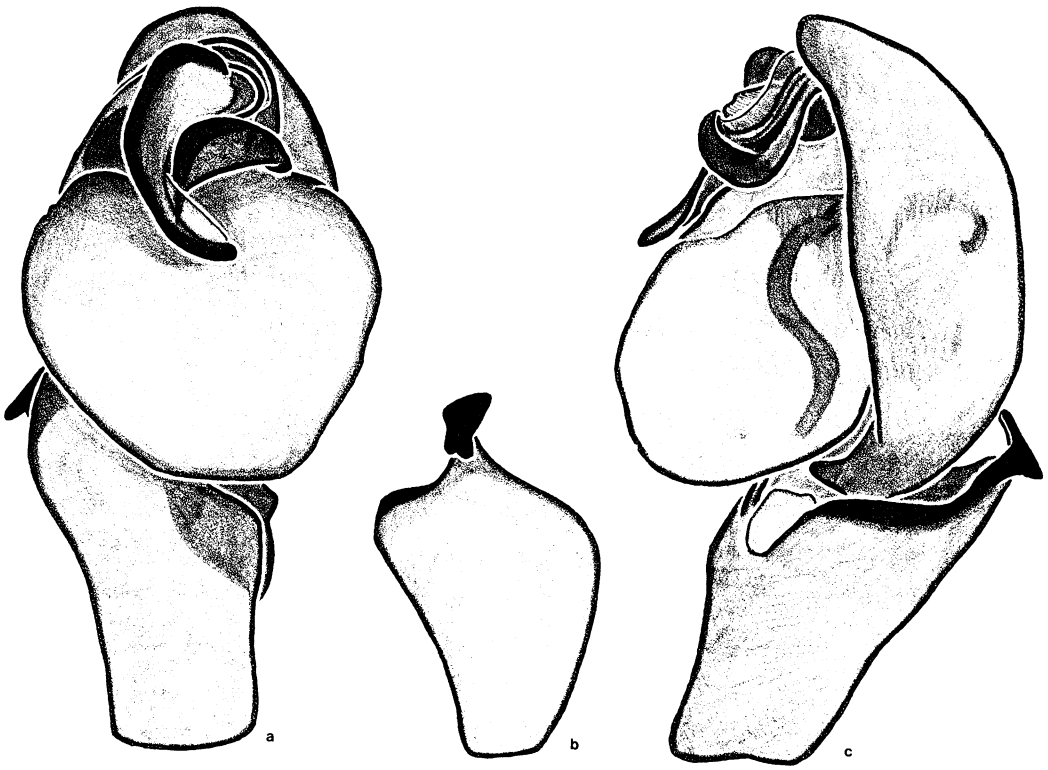

Fig. 51. *Namaquarachne thaumatula*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

by stout clasping spine, distad of this segment slightly sinuate, weakly narrowed and then expanded to midsegment, this area lined with very fine retrolateral and prodorsal spinules. Spination: leg I: femur d0-1-0-0, p0-0-1-1, r0-0-1-1, tibia p0-1-1-0, v0-0-2-2, r0-1-1-1, metatarsus p0-1-0-1, v0-2-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v2-0-2-2, r0-1-1-1, metatarsus p1-1-0, v2-0-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-1-0-1, patella d0-0, tibia d1-0-0-0, p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p1-0-1-2, v2-0-(3 diagonal = 1-1-1)-1, r1-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.42	3.67	3.42	4.33	1.58
Patella	1.67	1.33	1.25	1.58	0.67
Tibia	3.67	2.92	2.50	3.58	0.75
Metatarsus	4.83	3.42	3.08	4.25	—
Tarsus	2.00	1.58	1.33	1.67	1.33
Total	16.59	12.92	11.58	15.41	4.33

Palpal femur with 3 minute basal and row of 3 stout anterobasal thorns; tibia with short, slender dorsal process (D), apical dorsoventral knob large, length equal to length of process, anterior margin of R sector produced, sclerotized (fig. 51b); tegulum (fig. 51a, c) without processes, reservoir, where visible through retrolateral cuticle, gently sinuate; embolic origin prolateral, hidden by tegulum in ventral view, conductor directed proximally, apex blunt.

FEMALE (paratype): Total length 8.13. Entire specimen faded, markings obscure, but carapace appears to have had pars cephalica dusky along lateral margin, with short anteromedian, median, and posteromedian dusky radii; margin of pars cephalica with broad, dusky band extending anteriad from thoracic fovea; pars cephalica with dark, anterolateral reticulate markings and fine, reticulate markings extending anteriad from margin to each posterior eye; black pigment surrounding each eye and extending between

AM and between lateral eyes; chelicerae orange-brown, sternum, labium and palpal coxa yellow-brown, coxae, trochanters, legs and palpi yellow-white, palpal tarsus, apical half of metatarsus I and tarsus I orange-brown; abdomen gray-brown, shriveled, markings obscure but appear to have been a pair of light longitudinal bands on venter. Carapace 3.13 long, 2.41 wide; thoracic fovea deep, wide, length 0.12 carapace; clypeus 0.24 high; ocular area 0.40 long, 1.33 wide, PER slightly procurved; ratio of eyes AM:AL:PM:PL, 1.06: 1.13:1.00:1.25, diameter of PM 0.13; AM separated by ⅗ their diameter, separated from AL by AM diameter; PM separated by ⅔ their diameter, separated from PL by 1½ PM; lateral eyes separated by ⅛ PL. Chelicerae 1.57 long, with broad, weak ventral wrinkles; promargin of fang furrow with 5 teeth, retromargin with 4 large teeth and 1 minute tooth. Sternum 1.84 long, 1.38 wide, margin sinuate, apex weakly pointed; labium 0.53 long, 0.56 wide; palpal coxa 0.91 long, 0.56 wide. Femur I length 1.32 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p0-1-1-0, v0-0-3-3-2, r0-1-0-0; leg I: femur d0-1-0-0, p0-0-1-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p0-1-0-2, v2-2-0-1, r0-1-0-1; leg II: femur d0-1-0-0, p0-0-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d0-1-0-0, r0-0-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-0-0-0, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-0-0-2. Palpal femur with row of 3 stout anterobasal thorns. Calamistrum origin at 0.41 from metatarsus I base, length 0.35 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.19	2.91	2.31	2.94	1.13
Patella	1.25	1.31	1.00	1.06	0.50
Tibia	2.75	2.16	1.63	2.44	0.69
Metatarsus	2.69	2.25	1.69	2.31	—
Tarsus	1.25	1.13	1.00	1.00	1.13
Total	11.13	9.76	7.63	9.75	3.45

Epigynum as in figure 52d, with PMP broad, at least ½ PML width, anterior margin gently curved, copulatory openings large, anterolateral, longitudinal, with ventral rim lateral and dorsal rim median; spermathecae as in figure 52e, each with apex of anterodorsal blind, ending bulb extending anteriad of copulatory opening, copulatory chamber joining base of this bulb, with sinuous tube extending mesally and then posterolaterally to fertilization duct.

VARIATION: Total length 8.13–10.19; carapace length 1.30–1.39 times width; thoracic fovea narrow to wide; PER width 1.15–1.45 times AER, 2.52–2.86 times OAL; OQP 1.17–1.18 times OQA, 1.12–1.18 times OQL; cheliceral length 4.62–6.20 times clypeal height; sternum length 1.34–1.39 times width; labium length 0.94–0.96 width; femur I length 1.27–1.32 times carapace width; palpal femur with row of 3 or 4 stout anterobasal thorns.

DISTRIBUTION: Known only from the type locality in Namaqualand, Cape Province, South Africa (fig. 107).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Little Namaqualand, Steinkopf, Aug. 1904 (L. Schultze, SAM), 2♀.

Namaquarachne khoikhoiana, new species

Figures 12g, 52a–c, 53a–c, 54a, b, 107

TYPES: Holotype male, NMSA type no. 447, and 2 paratype females from beneath boulders in montane fynbos at 3600–4000 ft elev. in the Kamiesberg Mountains, 22–24 mi E of Kamieskroon, Cape Province, South Africa (Nov. 4–5, 1985, subsequently molted to maturity; C. E. Griswold), deposited in NMSA.

ETYMOLOGY: The specific name is in honor of the Khoikhoi ("men of men"), the original people of southwestern Africa.

DIAGNOSIS: Male palpus (fig. 53a, c) with apex of conductor acutely pointed; apical knob of palpal tibial process (D) small, shorter than process (fig. 53b, c); metatarsus I (fig. 54a, b) with large retrolateral submedian process surmounted by stout clasping spine, distad of this segment slightly sinuate, weakly narrowed and then expanded to midsegment, this area lined with very fine retrolateral and prodorsal spinules; male chelicerae with fine lateral spinules and broad, deep, ventrolateral striae; epigynum (fig. 52b) with PMP

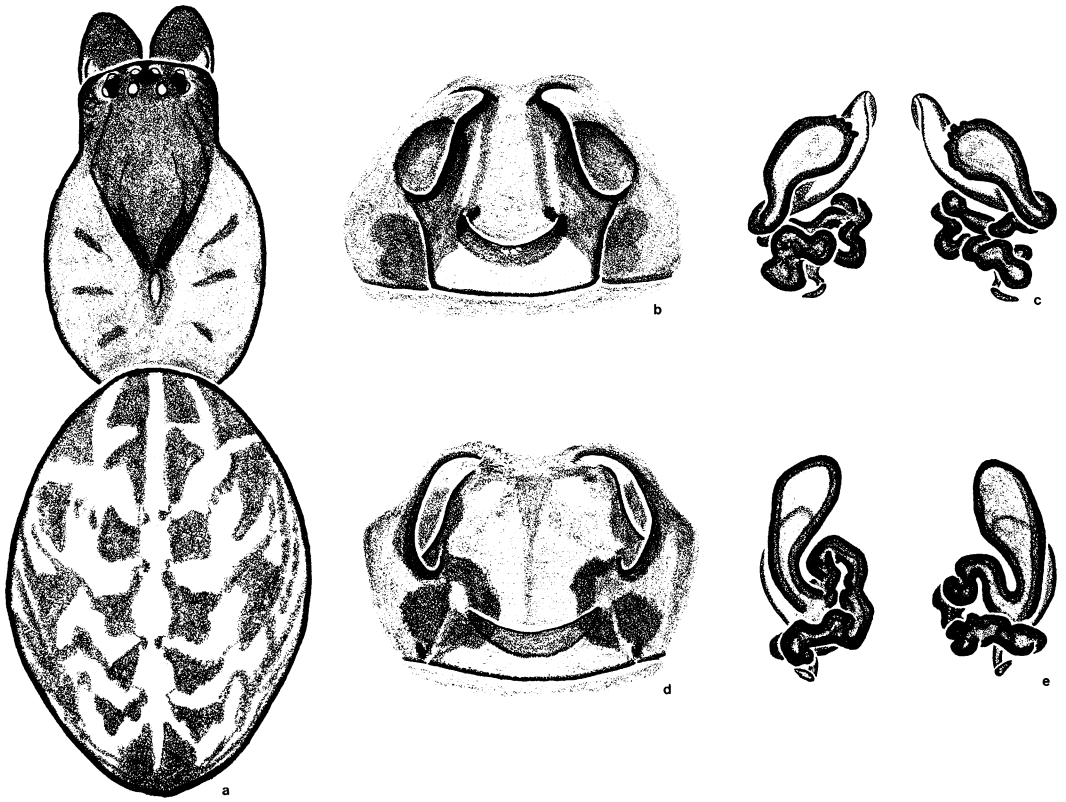

Fig. 52. *Namaquarachne* spp., females. a–c. *khoikhoiana*, new species, paratype. d, e. *thaumatula*, new species, paratype. **a.** Dorsal view. **b, d.** Epigyna, ventral. **c, e.** Spermathecae, dorsal.

broad, at least ½ PML width, copulatory openings large, anterolateral, longitudinal, with ventral rim median and dorsal rim lateral.

MALE (holotype): Total length 8.06. Carapace with pars thoracica yellow-white, pars cephalica yellow-brown with broad, dusky, v-shaped mark anteriad of thoracic fovea and dusky, longitudinal band on each side extending anteriorly for ⅔ pars cephalica; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown, boss yellow-brown; sternum, labium, coxae, trochanters, legs and palpi yellow-white, sternum dusky, metatarsus-tarsus I orange-brown. Legs with broad, dusky annuli: femora II–IV with median and subapical, patellae I–IV with apical, tibiae III–IV with median and apical, and metatarsi III and IV with apical. Abdomen yellow-white, dorsum with anteromedian pair of longitudinal dark markings and 5 pairs of median and posteromedian dark spots, spots confluent posteriorly; sides with longitudinal dark mottling, venter with pair of bold, longitudinal light bands, between these gray-brown with light mottling. Carapace 3.69 long, 2.88 wide; thoracic fovea deep, narrowed posteriorly, length 0.17 carapace; clypeus 0.19 high; ocular area 0.42 long, 1.22 wide, PER straight; ratio of eyes AM:AL:PM:PL, 1.00: 1.38:1.13:1.38, diameter of PM 0.14; AM separated by ⅘ their diameter, separated from AL by 1⅛ AM; PM separated by 1⅓ their diameter, separated from PL by 1½ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 0.19 long, with fine lateral spinules and broad, deep, ventrolateral striae; promargin of fang furrow with 6 teeth, retromargin with 4 large teeth and 1 minute tooth. Sternum 2.13 long, 1.63 wide, margin sinuate, apex pointed; labium 0.63 long, 0.66

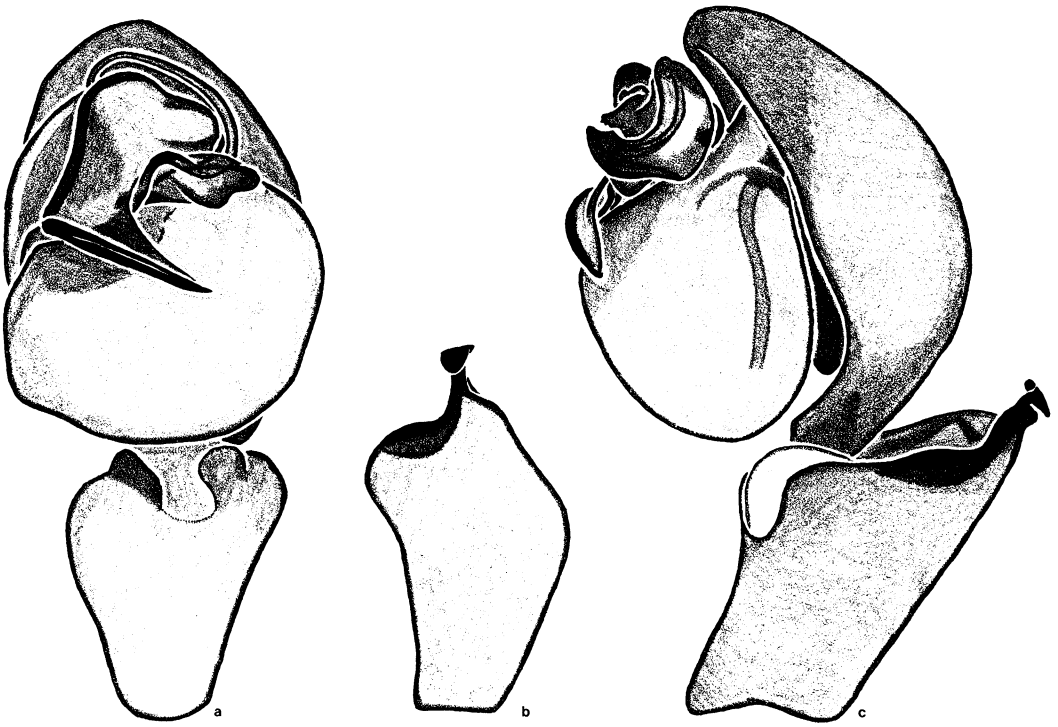

Fig. 53. *Namaquarachne khoikhoiana*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

wide; palpal coxa 1.16 long, 0.59 wide. Femur I length 1.57 times carapace width; metatarsus I (fig. 54a, b) with proximal retrolateral spur surmounted by stout clasping spine, short constriction distad of spur. Spination: leg I: femur d0-1-0-0, p0-1-1-1, r0-0-1-0, tibia p0-1-1-0, v0-0-2-2, r1-1-1-0, metatarsus p0-1-0-1, v2-2-0-1, r0-1-0-1; leg II: femur d0-1-1-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.50	3.69	3.56	4.38	1.50
Patella	1.75	1.38	1.25	1.50	0.63
Tibia	3.88	3.13	2.75	3.81	0.63
Metatarsus	4.44	3.56	3.31	4.19	—
Tarsus	1.81	1.38	1.31	1.38	1.19
Total	16.38	13.14	12.18	15.26	3.95

Palpal femur with proximal group of 5 minute and distal row of 3 large anterobasal thorns; palpal tibia (fig. 53b) with dorsal process (D) long, slender, apical dorsoventral knob small, length less than that of apophysis, anterior margin of R sector produced, sclerotized; tegulum without processes, reservoir, where visible retrolaterally through tegular cuticle, nearly straight; origin of embolus prolateral, hidden in ventral view; apex of conductor directed proximally, apex pointed (fig. 53a, c).

FEMALE (paratype): Total length 8.75. Markings (fig. 52a) as in male except pars thoracica with short, dusky anteromedian, median, and posteromedian radii. Carapace 3.75 long, 2.97 wide; length thoracic fovea 0.17 carapace length; clypeus 0.64 high; ocular area 0.40 long, 1.22 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.00:1.00:1.20, diameter of PM 0.16; AM separated by ½ their diameter, separated from AL by AM diameter; PM separated by 1⅔ their diameter, separated from PL by 1⅘ PM; lateral eyes sep-

arated by ¼ PL. Chelicerae 1.68 long, with broad, shallow ventrolateral wrinkles; promargin of fang furrow with 1 minute and 4 large teeth, retromargin with 5 large teeth and 1 minute tooth. Sternum 1.97 long, 1.56 wide, apex a right angle; labium 0.66 long, 0.66 wide; palpal coxa 1.09 long, 0.63 wide. Femur I length 1.33 times carapace width. Spination: palpus: femur d0-0-1, patella, d0-0-1, p0-1-1-0, tibia d0-0-0-1, p0-1-1-0, tarsus p0-2-2-0, v0-0-1-1-2-2-1, r0-1-1-0; leg I: femur d1-0-1-0, p0-1-1-1, tibia p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p0-1-0-1, v2-1-0-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-1-1-1, r0-1-0-0, tibia p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-2-0-0, p0-1-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d1-0-1-0, tibia d1-0-0-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-0-1-2, v2-2-0-1, r1-0-0-2. Palpal femur with row of 1 small and 3 stout anterobasal thorns. Calamistrum origin at 0.35 from metatarsus base, length 0.40 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.94	3.06	2.81	3.75	1.38
Patella	1.56	1.31	1.19	1.31	0.56
Tibia	3.44	2.31	1.94	2.88	0.81
Metatarsus	3.56	2.44	2.13	3.00	—
Tarsus	1.56	1.25	1.13	1.25	1.38
Total	14.06	10.37	9.20	12.19	4.13

Epigynum as in figure 52b, copulatory openings large, anterolateral, longitudinal, with ventral rim median and dorsal rim lateral, PMP broad, at least ½ PML width, anterior margin gently curved; spermathecae as in figures 12g and 52c, each with copulatory opening anterior of apex of dorsal blind, ending bulb, copulatory chamber joining bulb basally, slender tube leaving base of bulb and extending anteromesally and then posteriorly to fertilization duct.

VARIATION: Total length 8.00–8.75; carapace length 1.26–1.45 times width; thoracic fovea 0.12–0.17 length carapace, narrow to wide; PER width 1.13–1.14 times AER, 2.91–3.04 times OAL; OQP 1.19–1.33 times OQA, 1.28–1.35 times OQL; cheliceral length 2.63–5.79 times clypeal height, promargin of fang furrow with 5 or 6 teeth; sternum length 1.26–1.30 times width; labium length 0.91–1.00 width. Leg markings distinct to obscure; femur I length 1.33–1.49 times carapace width.

NATURAL HISTORY: I have collected this species from beneath boulders in montane fynbos. The surrounding vegetation was low and shrubby and the habitat was semiarid. The spiders were taken from within deep, shaded clefts between boulders where a reasonably humid microenvironment could be maintained.

DISTRIBUTION: Known only from the type locality in the Kamiesberg Mountains, Cape Province, South Africa (fig. 107).

Namaquarachne tropata, new species

Figures 2a–d, 5a, b, 48a–e, 49a–d, 54e, f, 55a–c, 56a–f, 57c, f, 107

NOTE: Lehtinen's (1967) figure 392, labeled as "*Themacrys* sp.," is evidently the epigynum of this species.

TYPES: Holotype male, NMSA type no. 433, from indigenous forest at an elevation of 1600 ft, Grootvadersbosch Forest Station, 20 km WNW Heidelberg, Cape Province, South Africa (Nov. 8–10, 1985, subsequently molted to maturity in captivity; C. E. Griswold & T. Meikle-Griswold), deposited in NMSA; paratypes, same data, 10 males and 9 females, 1 pair each in AMNH, MRAC, NMNH, and CAS, remainder in NMSA.

ETYMOLOGY: The specific name is from the Greek *tropos*, meaning a twisted leather thong, referring to the form of the conductor.

DIAGNOSIS: Male palpal tibia with apical knob of dorsal process (D) very small, rounded (figs. 49a, b, 55b, c); apex of conductor twisted into retrolateral spiral (figs. 48b, d, 55c); male metatarsus I (fig. 54e, f) straight, with small retrolateral spur at midsegment surmounted by stout clasping spine; epigynum (figs. 49d, 57c) with copulatory openings median, circular, PMP as broad as PML, anterior margin straight to weakly procurved.

MALE (paratype, NMSA): Total length 7.31. Carapace pale yellow-brown, pars thoracica with dusky margin and anteromedian, median, and posteromedian dusky radii; pars cephalica with broad, dusky, v-shaped mark anteriad of thoracic fovea and dusky, longitudinal band on each side extending anteriorly along margin of pars cephalica; ocular

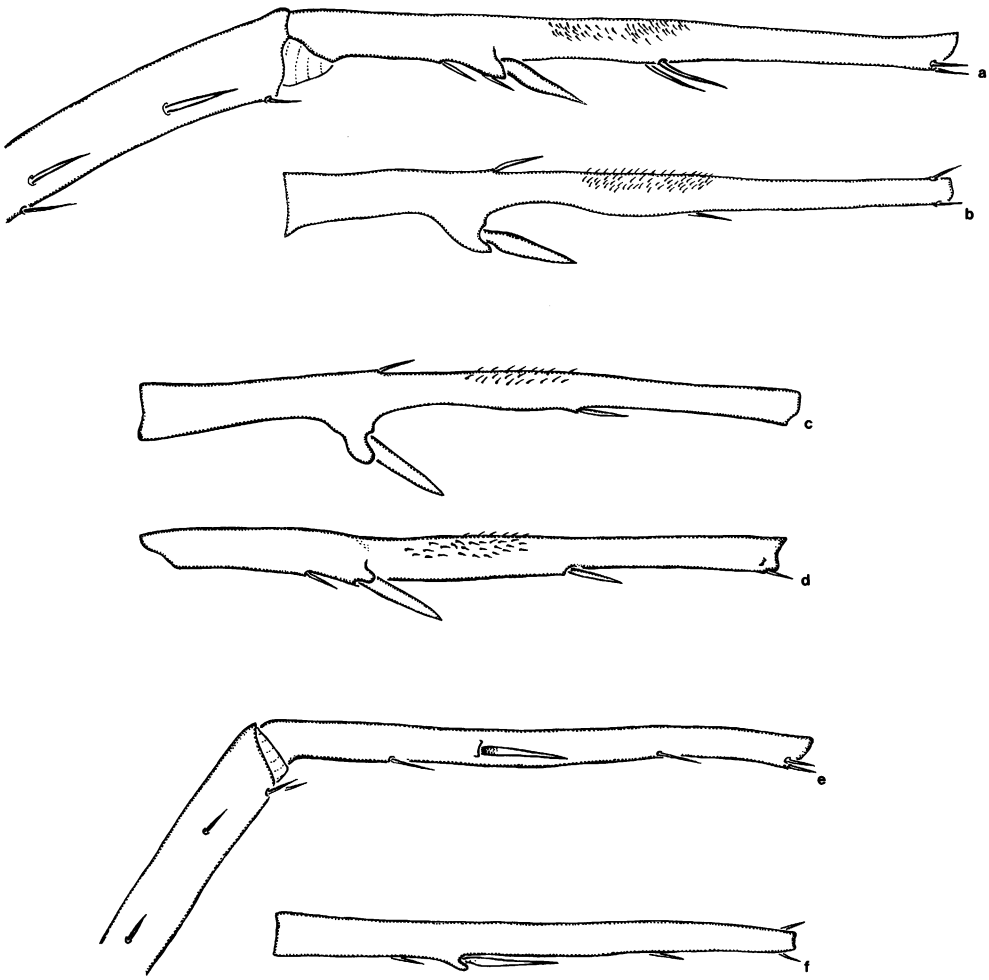

Fig. 54. *Namaquarachne* spp., right male leg I. a, b. *khoikhoiana*, new species, holotype. c, d. *thaumatula*, new species, holotype. e, f. *tropata*, new species, paratype. **a, e.** Apices of tibiae and metatarsi, retrolateral. **d.** Metatarsus, retrolateral. **b, c, f.** Metatarsi, dorsal.

area dusky, black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown, boss yellow-white; labium and palpal coxa yellow-brown, sternum, coxae, trochanters, legs and palpi yellow-white; sternum and coxae with dusky infuscations. Legs with broad, dusky annuli: femora II–IV with median and subapical, patellae I–IV with apical, tibiae III–IV with median and apical, and metatarsi II–IV with dark apical. Abdomen yellow-white, dorsum with anteromedian paired dark spots and 4 pair of posterior transverse dark markings extending onto sides; sides with oblique longitudinal maculations, venter with broad light longitudinal bands, confluent in center. Carapace 3.44 long, 2.56 wide, margin sinuate; thoracic fovea length 0.14 carapace; clypeus 0.29 high; ocular area 0.38 long, 1.06 wide; ratio of eyes AM:AL:PM:PL, 1.05:1.16:1.00:1.05, diameter of PM 0.15; AM separated by ½ their diameter, separated from AL by ⅘ AM; PM separated by their diameter, separated from PL by 1⅛ PM diameter; lateral eyes separated by ¼ PL. Chelicerae 1.74 long, with lateral longitudinal row of spinules and deep ventrolateral striae (fig. 49c); promargin of fang furrow with 6 teeth, retromargin with 4 large teeth and 2 minute teeth. Sternum 1.78 long, 1.44 wide, apex blunt;

labium 0.63 long, 0.53 wide; palpal coxa 1.13 long, 0.56 wide. Femur I length 1.66 times carapace width; metatarsus I (fig. 54e, f) straight, with small retrolateral spur at midsegment surmounted by stout clasping spine. Spination: palpus: femur d0-1-0; leg I: femur d0-0-1-0, p0-0-1-1, r0-1-1-0, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-0-0-1; leg II: femur d1-0-1-0, p0-0-0-1, r0-0-1-0, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-0-0-1, v0-1-0-2, r0-0-0-1, metatarsus p1-1-0-2, v2-0-1-1, r1-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.25	3.38	3.06	3.81	1.57
Patella	1.50	1.31	1.06	1.31	0.56
Tibia	3.88	2.69	2.19	3.38	0.56
Metatarsus	4.13	3.00	2.56	3.44	–
Tarsus	1.56	1.25	1.13	1.38	1.38
Total	15.32	11.63	10.00	13.32	4.07

Palpal femur with basal group of 3 small and row of 3 stout anterobasal thorns; dorsal process (D) of tibia long, slender, apical knob small, rounded (fig. 55b, c); tegulum with small retroapical median apophysis (figs. 48e, 55a), reservoir, where visible through ventral tegular cuticle, sinuate; embolus arising basally and spiraling around prolateral side of bulb, conductor apically and retrolaterally twisted (fig. 55c) into broad spiral, conductor apex retroapical.

VARIATION: Total length 6.63–7.94; carapace length 1.34–1.36 times width, markings distinct to obscure; thoracic fovea 0.12–0.14 length carapace; PER width 1.11–1.20 times AER, 2.50–2.75 times OAL; OQP 1.18–1.24 times OQA, 1.15–1.18 times OQL; cheliceral length 5.22–7.06 times clypeal height, promargin of fang furrow with 5 or 6 teeth; sternum length 1.24–1.30 times width, apex a right angle to blunt; labium length 1.06–1.18 times width. Leg markings distinct and annulate, to obscure and uniform.

FEMALE (paratype, NMSA): Total length 8.38. Carapace marked as in male, except darker and with markings obscure; chelicerae red-brown, boss yellow-brown; venter marked as in male; legs yellow-brown, unmarked, without annuli; abdomen marked as in male. Carapace 4.13 long, 2.84 wide; thoracic fovea deep, narrowed posteriorly, length 0.09 carapace; clypeus 0.34 high; ocular area 0.43 long, 1.31 wide; ratio of eyes AM:AL: PM:PL, 1.00:1.31:1.31:1.38, diameter of PM 0.17; AM separated by 1⅛ their diameter, separated from AL by 1⅓ AM; PM separated by 1½ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ½ PL diameter. Chelicerae 1.98 long, robust, with broad, shallow ventrolateral wrinkles; promargin of fang furrow with 6 teeth, retromargin with 4 large and 2 minute teeth. Sternum 2.22 long, 1.63 wide, margin sinuate, apex a right angle; labium 0.84 long, 0.69 wide; palpal coxa 1.38 long, 0.78 wide. Femur I length 1.36 times carapace width. Spination: palpus: femur d0-0-1-1, patella d0-0-1, p0-1-0, tibia p0-1-1-0, tarsus p0-2-2-1, v0-1-1-3-2, r0-1-0; leg I: femur d0-0-1-0, p0-0-1-1, tibia p0-0-1-0, v0-2-0-2, metatarsus p0-0-0-1, v2-2-0-1, r0-0-0-1; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v0-2-0-2, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, tibia v0-1-0-2, r0-1-1-0, metatarsus p1-0-02, v2-1-0-1, r1-0-0-2. Palpal femur with basal pair and row of 4 stout anterobasal thorns, increasing in length distally. Calamistrum origin at 0.34 from metatarsus base, length 0.34 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.88	3.19	2.81	3.63	1.63
Patella	1.56	1.44	1.25	1.44	0.63
Tibia	3.44	2.44	2.00	3.13	0.81
Metatarsus	3.38	2.50	2.31	3.13	–
Tarsus	1.69	1.44	1.25	1.44	1.50
Total	13.95	11.01	9.62	12.77	4.57

Epigynum as in figure 57c, copulatory openings central, circular, PMP as broad as PML, anterior margin straight to slightly procurved; spermathecae as in figure 57f, each with copulatory chamber central, leading to anteromedian blind, ending pocket, spermathecal tubes convoluted, leading to posterior fertilization duct.

VARIATION: Total length 5.63–9.69; carapace length 1.38–1.49 times width, markings distinct to obscure; thoracic fovea 0.09–0.14

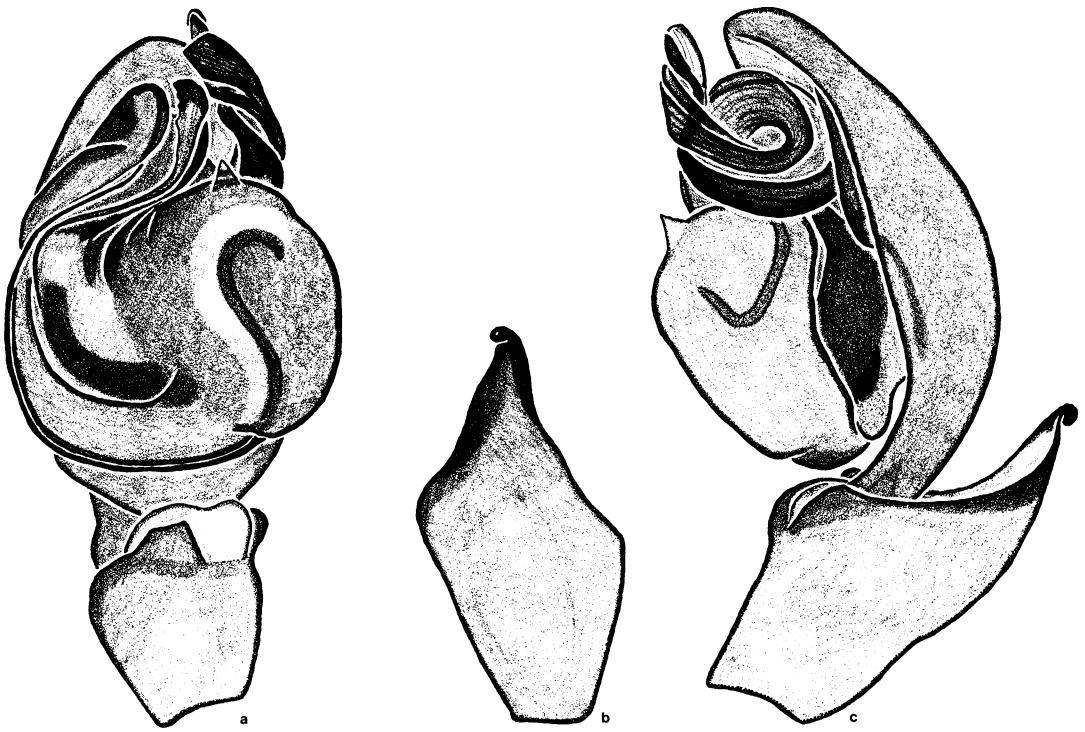

Fig. 55. *Namaquarachne tropata*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

length carapace; PER width 1.11–1.19 times AER, 3.04–3.65 times OAL; OQP 1.27–1.37 times OQA, 1.28–1.52 times OQL; cheliceral length 5.00–6.00 times clypeal height, promargin of fang furrow with 5 or 6 teeth; sternum length 1.28–1.37 times width, apex a right angle to blunt; labium length 0.94–1.23 times width. Leg markings distinct to obscure, uniform to annulate; femur I length 1.36–1.40 times carapace width; palpal femur (fig. 5a, b) with row of 3 or 4 stout anterobasal thorns; abdomen with ventral longitudinal light bands broad and confluent, or separate, with median light spots. Epigynum (figs. 49d, 57c) with PMP straight to slightly recurved, pocket entire or constricted in center, convolutions of spermathecal tubes quite variable, and may be asymmetrical.

NATURAL HISTORY: I have collected this species in wet, cool-temperate forest at Grootvadersbosch Forest Station were they are abundant and are the commonest cribellate spiders in this habitat. Label data suggest that this species also inhabits caves.

DISTRIBUTION: Moist forests in the southern Cape Province, South Africa (fig. 107).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Grootvadersbosch Forest Station, 20 km WNW Heidelberg, Nov. 8–10, 1985, indigenous forest, elev. 1600 ft (C. E. Griswold, T. Meikle-Griswold, & J. T. Doyen, NMSA), 26♀; Riverzonderende, Dec. 1920 (R. W. Tucker, SAM), 3♀; Zonderend Mts., Jan. 1919 (R. N. Barnard, SAM), 1♂, 1♀; Tsitsikama Coastal Park, Stormsrivier at coast, Bat Cave, twilight, March 11, 1978 (D. & M. Davis, B. Akerbergs, NMNH), 2♂, 1♀.

Namaquarachne hottentotta (Pocock), new combination

Figures 57a, d, 107

Auximus hottentottus Pocock, 1900: 323 (female holotype from Garies, South Africa, in BMNH, examined). – Roewer, 1954: 1361.
Matundua hottentotta: Lehtinen, 1967: 247.
Auximus hottentotus: Bonnet, 1955: 824 (lapsus).

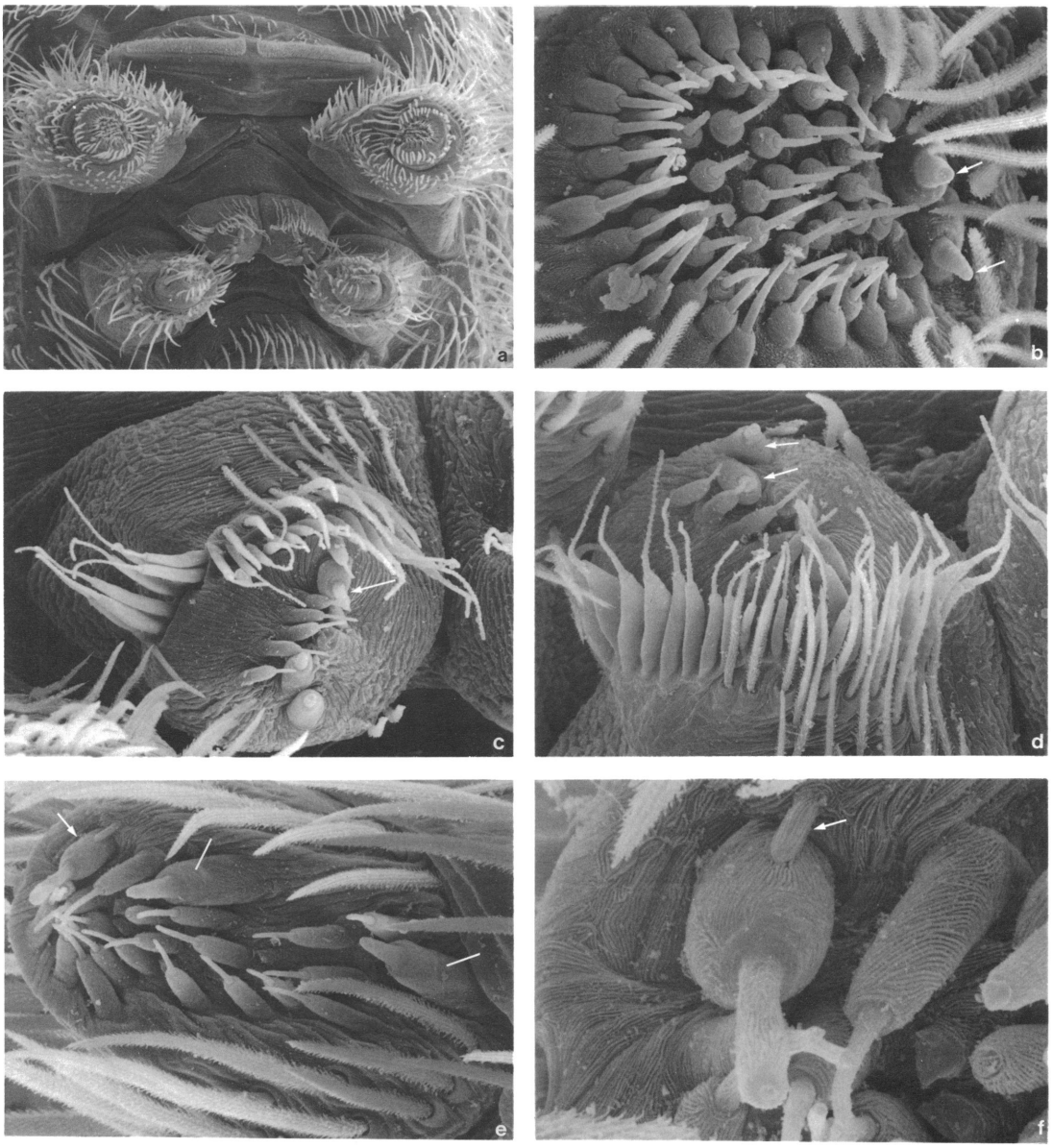

Fig. 56. *Namaquarachne tropata*, new species, Grootvadersbosch, female, spinnerets. **a.** Cribellum and spinnerets, ventral. **b.** Right ALS, apex, showing piriform spigots; arrows to major ampullate spigots (anterior at top, mesal at right). **c.** Apex of right PMS; arrow to minor ampullate spigot (anterior at top, mesal at right). **d.** Left PMS, anterior view, showing separate paracribellar spigots; arrows point to tubuliform spigots. **e.** Right PLS, apex with aciniform spigots; arrow to amaurobiid PLS spigot; lines to tubuliform spigots (anterior at top, mesal at right). **f.** Cuticular lobe (arrow) at base of amaurobiid PLS spigot on right PLS.

DIAGNOSIS: Epigynum (fig. 57a) with PMP very narrow, width less than ⅓ that of PML, copulatory openings small, lateral; anterior loops of spermathecae broad, transverse (fig. 57d).

FEMALE (holotype): Total length 10.00. Entire specimen in poor shape, broken up and darkened. Carapace dark red-brown, darkened submarginally and with dark anterolateral, lateral, and posterolateral radii; margins

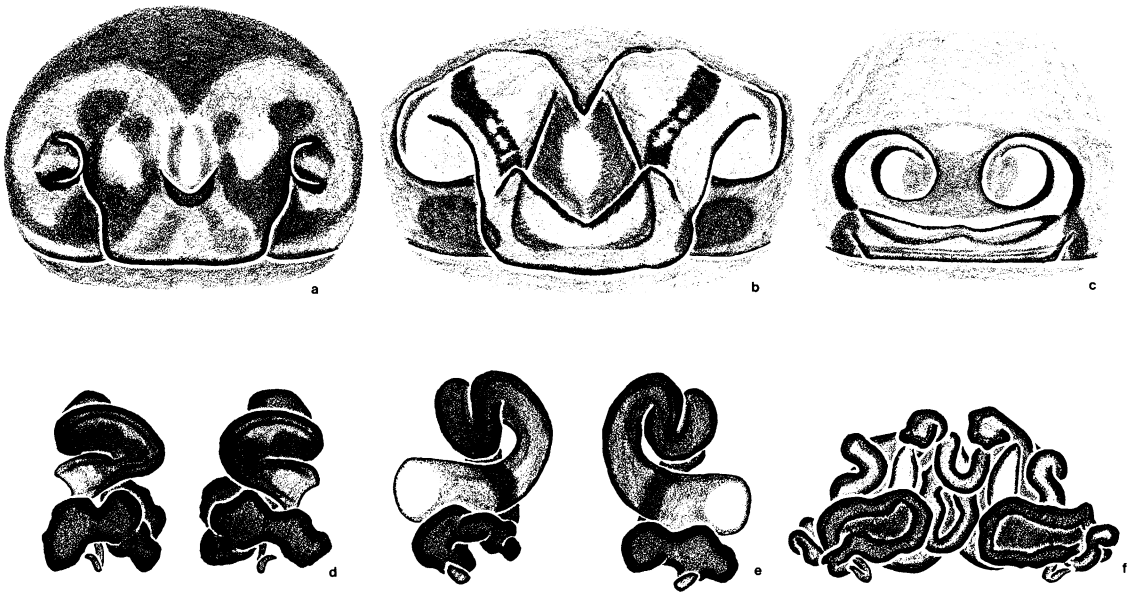

Fig. 57. *Namaquarachne* spp., female genitalia. a, d. *hottentotta* (Pocock) (holotype of *Auximus hottentottus* Pocock). b, e. *angulata*, new species, holotype. c, f. *tropata*, new species, paratype. **a-c.** Epigyna, ventral. **d-f.** Spermathecae, dorsal.

of pars cephalica dusky, with faint reticulations behind and beside ocular area; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown; labium and palpal coxa red-brown, lighter at tips; sternum red-brown suffused with dusky pigment; coxae, trochanters, palpi, and legs yellow-brown, femora to tibiae with dusky lateral markings, tibiae orange-brown, palpal tarsus and metatarsi to tarsi I and II red-brown; abdomen appears to have had dorsal pattern typical of genus, markings of venter obscure. Carapace 4.52 long, 3.16 wide; thoracic fovea deep, length 0.15 carapace; clypeus 0.36 high; ocular area 0.42 long, 1.32 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.14:1.14:1.14, diameter of PM 0.16; AM separated by their diameter, separated from AL by 1½ times AM diameter; PM separated by 1⅔ times their diameter, separated from PL by twice PM diameter; lateral eyes nearly contiguous. Chelicerae 1.80 long, robust, smooth; promargin of fang furrow with 6 or 7, retromargin with 5 teeth. Sternum 2.40 long, 1.80 wide, margin weakly sinuate, apex pointed; labium 0.80 long, 0.80 wide; palpal coxa 1.28 long, 0.76 wide. Femur I length 1.34 times carapace width. Spination: palpus: femur d0-0-1, tibia p1-1-0, tarsus p2-1-0, v1-0-1-2-3, r1-0-0; leg I: femur d0-1-0-0, p0-0-1-1, tibia p1-1-1-0, v2-2-2, r1-0-1-1, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg II: femur d1-1-0-0, p0-0-1-1, tibia p1-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-0-0-1, r0-1-1-1, patella d0-0-1, tibia d1-0-0-0, p1-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, tibia d1-0-0-0, p1-1-0-1, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-0-0-2. Calamistrum origin at 0.38 from metatarsus base, length 0.33 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.25	3.42	3.25	4.00	1.50
Patella	1.67	1.50	1.42	1.58	0.75
Tibia	3.75	2.58	2.17	3.17	0.92
Metatarsus	3.91	2.58	2.50	3.25	—
Tarsus	1.83	1.42	1.25	1.42	1.58
Total	15.41	11.50	10.59	13.42	4.75

Palpal femur with basal group 6 or 7 minute and row of 3 stout anterobasal thorns. Epigynum as in figure 57a, PMP very narrow, width less than ⅓ that of PML, copulatory

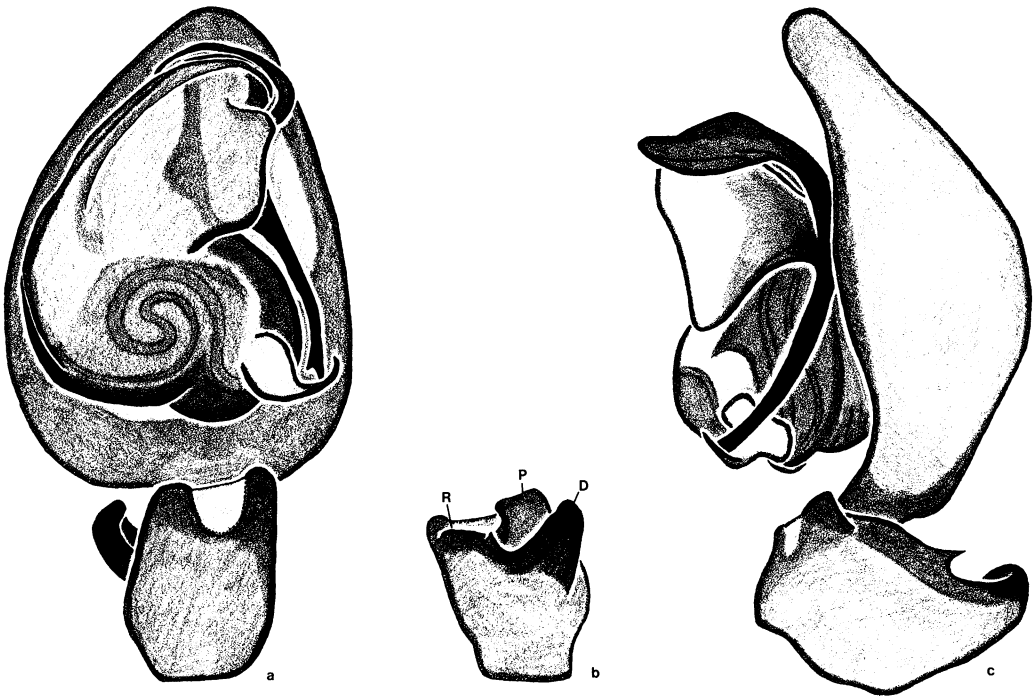

Fig. 58. *Lamaika distincta*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. R = retrodorsal tibial lobe; P = prolateral tibial process; D = dorsal tibial process.

openings small, lateral; spermathecae as in figure 57d, anterior loops broad, transverse.

MALE: Unknown.

DISTRIBUTION: Known only from the type locality in Namaqualand, Cape Province, South Africa.

LAMAIKA, NEW GENUS

TYPE SPECIES: *Lamaika distincta*, new species.

ETYMOLOGY: The generic name is an arbitrary combination of letters, and is considered feminine in gender.

DIAGNOSIS: Male palpus with apex of conductor an elongate, flattened, sclerotized rod (fig. 58c); reservoir visible through tegulum as a recurved loop, median apophysis (MA) arising retrobasally, stout, clavate, with hooked apex (fig. 58a); male metatarsus I with short, subbasal retrolateral process surmounted by slender, sinuate clasping spine (fig. 59c–e).

DESCRIPTION: (see description of *Lamaika distincta*, new species).

COMPOSITION: One species.

DISTRIBUTION: Southern Cape coast, South Africa (fig. 110).

Lamaika distincta, new species
Figures 58a–c, 59c–e, 110

TYPES: Male holotype from forest at Ruigtevlei (34°03′S; 22°50′E), Sedgefield, Cape Province, South Africa (Oct. 1984; R. J. Dowsett), deposited in MRAC. Paratype male, same data.

ETYMOLOGY: The specific name refers to the unusual form of the species.

DIAGNOSIS: Male palpus as in figure 58a–c, with apex of conductor an elongate, flattened, sclerotized rod with forked tip, extending proximally to MA; male metatarsus I with short, subbasal retrolateral process surmounted by slender, sinuate clasping spine, with dorsal group of long hairs at level of clasping spine, and prodorsal blunt-tipped spine set in large socket, anterior of these a retrolateral concavity lined with short, stout

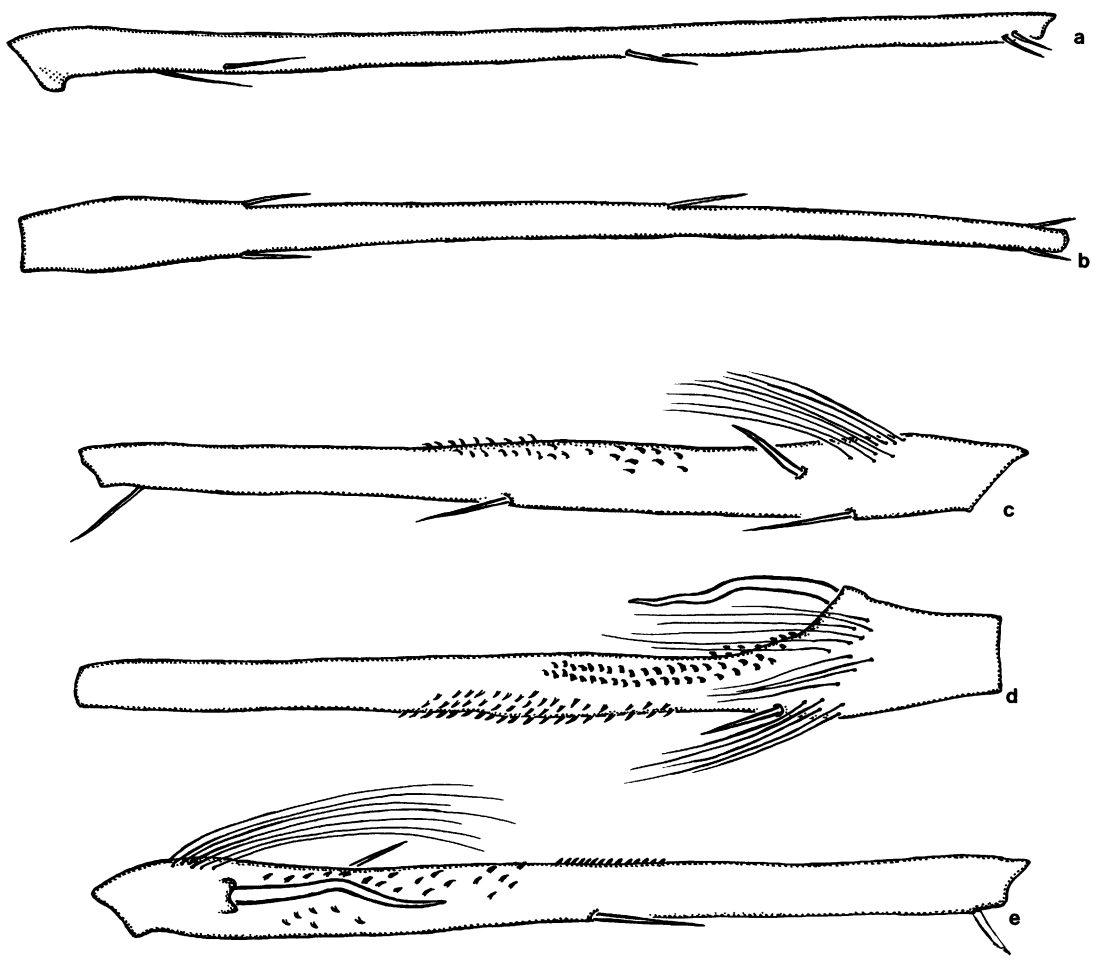

Fig. 59. Phyxelidinae males, right metatarsi I. a, b. *Malaika longipes* (Purcell), Skeleton Gorge. c–e. *Lamaika distincta*, new species, holotype. **a, e.** Retrolateral. **b, d.** Dorsal. **c.** Prolateral.

spinules, and submedian dorsal group of spinules (fig. 59c–e); palpal coxa unmodified.

MALE (holotype): Total length 4.08. Carapace, venter of cephalothorax, and legs yellow-brown, abdomen gray; pars cephalica with faint, narrow, dark v anteriad of thoracic fovea, extending anteriad toward ocular area; ocular area with black pigment surrounding each eye and extending between anterior eyes and between AER and PLE; metatarsus I orange-brown; venter of abdomen with pair of faint, narrow light bands and light around spinnerets. Carapace 1.92 long, 1.48 wide, margin entire, with long setae along margin and posteriorly; thoracic fovea long, deep, narrow, length 0.21 carapace; clypeus 0.13 high; ocular area 0.20 long, 0.44 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.50:1.67:2.00, diameter of PM 0.10; AM separated by ⅛ their diameter, separated from AL by ½ AM; PM separated by ¾ their diameter, separated from PL by ¾ PM; lateral eyes nearly contiguous. Chelicerae 0.74 long, smooth, slender, with lateral longitudinal group of small spinules; promargin of fang furrow with 4 heterogeneous teeth, retromargin with 3 uniform teeth. Sternum 1.08 long, 0.92 wide, margin weakly sinuate, apex blunt; labium 0.32 long, 0.30 wide; palpal coxa 0.56 long, 0.28 wide. Femur I length 1.63 times carapace length; metatarsus I (fig. 59c–e) with short, subbasal retrolateral process sur-

mounted by slender, sinuate clasping spine, with dorsal group of long hairs at level of clasping spine and prodorsal blunt-tipped spine set in large socket, anterior of these retrolateral concavity lined with short, stout spinules, and with submedian dorsal group of spinules. Spination: leg I: femur d0-1-0-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v1-0-2-0, r0-0-1-0, metatarsus v1-1-0-1, r0-1-0-0; leg II: femur d0-1-0-2, tibia p0-1-1-0, v2-2-0-2, r0-0-1-0, metatarsus p1-1-0-1, v2-2-0-2, r0-1-0-1; leg III: femur d0-1-0-2, patella d0-0-1, tibia d0-1-0-0, p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-2-2, r1-1-0-2; leg IV: femur d0-1-0-1, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-1-0-2, r0-0-1-0, metatarsus p1-1-0-2, v0-2-2-1, r1-1-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	2.42	1.92	1.75	2.50	0.92
Patella	0.83	0.71	0.63	0.71	0.33
Tibia	2.17	1.67	1.42	2.25	0.29
Metatarsus	2.03	1.67	1.50	2.25	—
Tarsus	1.00	0.79	0.83	0.92	0.83
Total	8.45	6.76	6.13	8.63	2.37

Palpal femur with group of 3 anterobasal stout elongate thorns and 2 isolated distal thorns; tibia as in figure 58b, with dorsal process (D) large, long, and blunt-tipped, prolateral process (P) very weak, D connected to retrolateral lobe (R) by ridge with small, slender, dorsad-directed process; palpal bulb with tegulum (fig. 58a) as large as conductor, reservoir visible through tegulum as a recurved loop, MA arising retrobasally, stout, clavate, with hooked apex, origin of embolus probasal, origin of lamellar pars pendula promedian, apex of conductor an elongate, flattened, sclerotized rod with forked tip, extending proximally to MA (fig. 58c).

FEMALE: Unknown.

NATURAL HISTORY: The label data suggest occurrence in cool-temperate forest.

DISTRIBUTION: Known only from the type locality in coastal forest at Ruigtevlei in the southern Cape Province, South Africa (fig. 110).

MALAIKA LEHTINEN

Malaika Lehtinen, 1967: 246, 330 (type species by monotypy *Auximus longipes* Purcell, male and female syntypes in SAM, examined). – Brignoli, 1983: 528.

DIAGNOSIS: Male palpus with median apophysis (MA) clavate, with apical hook, directed retrolaterad (fig. 60b, d, f), and enlarged lobate apical conductor with encircling groove for embolus, conductor (fig. 60b) greater than twice size of tegulum, distal part of conductor a separate, sclerotized, basally wrinkled lobe (fig. 60f) with a sharply pointed apex (CA); male palpal coxa with basal dorsolateral triangular projection; epigynum (fig. 61c, d) with recurved lateral transverse ridges (LTR), posterior median lobe (PML) oval, posterior margin projecting; each spermatheca a longitudinal cylindrical capsule with external spiraled afferent duct and straight internal efferent duct leading to chamber in posterior dorsal lobe (fig. 11a).

DESCRIPTION: Small to medium size spiders, total length 3.50–10.00. Carapace length 1.11–1.45 times width; thoracic fovea (fig. 68c) a long, narrow, deep slit, length greater than 8 times width, 0.14–0.27 carapace length; PER straight to slightly procurved, AER straight, ocular area width 2.20–3.08 times length; clypeal height 1.78–3.88 times AM diameter; chelicerae smooth, length 4.23–5.69 times clypeal height, promargin of fang furrow with 6–8 teeth, retromargin with 5–8 heterogeneous teeth. Sternum length 1.02–1.26 times width, base broad and truncate, greatest width 1.29–1.67 times base width, apex pointed to blunt; labium length 0.92–1.35 times width. Legs covered with feathery hairs (fig. 6d), long, femur I length 1.63–2.00 times carapace width; leg formula 1423; male metatarsus I unmodified (fig. 59a, b); legs uniformly marked or with weak annuli on posterior legs; metatarsi lacking apical combs; calamistrum subapical, origin at 0.52–0.61 from metatarsus IV base, length 0.19–0.31 metatarsus length; pseudocalamistrum absent. Palpal femur with anterobasal rows of slender setae in enlarged bases (fig. 4b), thorns absent or with some setae thickened as thorns. Male palpal tibia with dorsad directed flange (P) at prolateral base of cymbium (fig. 61a, b), stout, broad, conical dorsal process (D), and produced retrolateral lobe (R) connected to D process by a ridge (fig. 61b). Palpal bulb (fig. 60a, b) with tegulum equal to or smaller than apical, unsclerotized, grooved conductor (C), embolus (E) spinelike with associated lamellar pars pendula (PP), embolus hidden

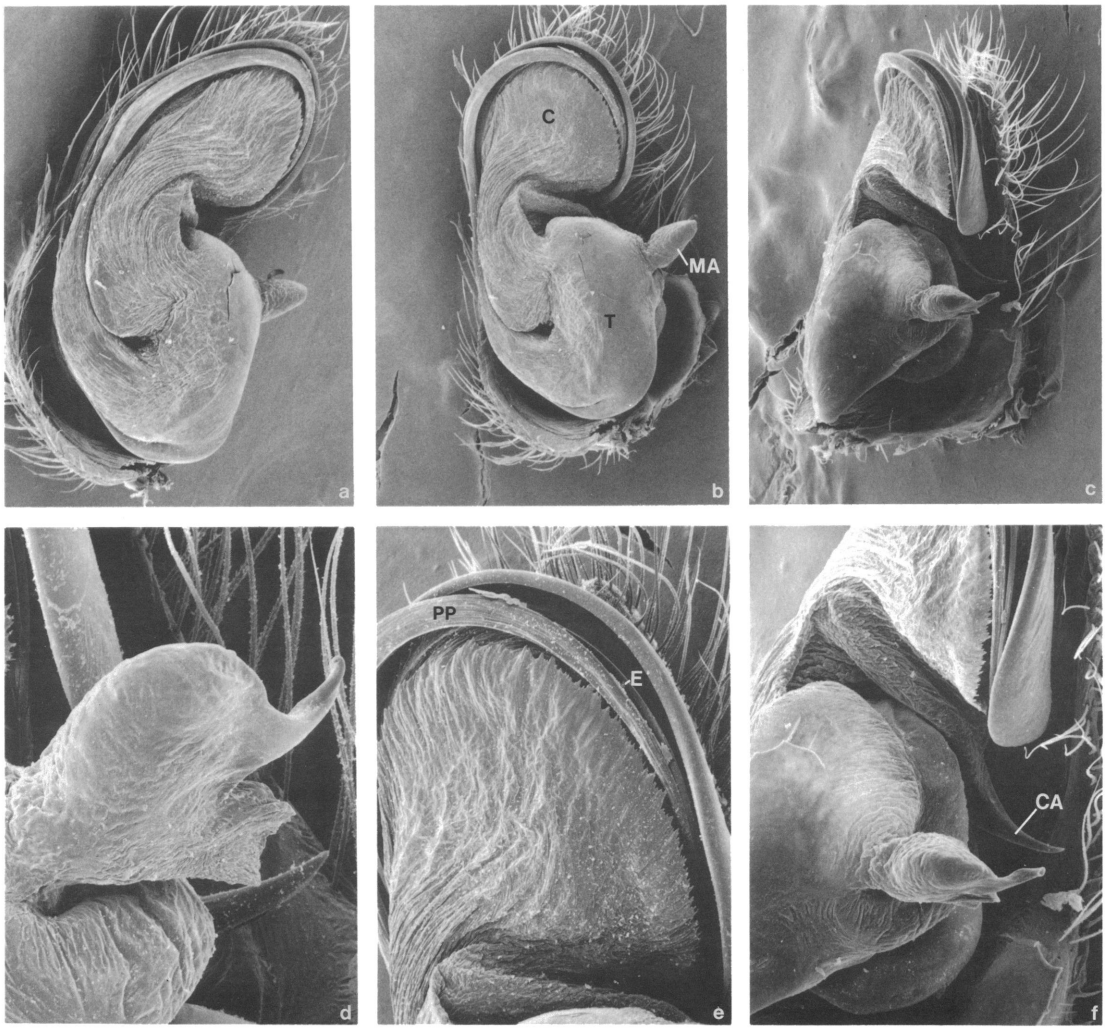

Fig. 60. *Malaika longipes* (Purcell), Skeleton Gorge, male palpal bulb. **a.** Ventral. **b.** Retroventral. **c.** Retrolateral. **d.** Median apophysis, retroventral. **e.** Distal aspect of conductor, showing groove in which embolus fits. **f.** Retrolateral, showing apex of conductor. C = conductor; T = tegulum; MA = median apophysis; CA = conductor apex; PP = lamellate pars pendula; E = embolus.

distally in conductor groove (fig. 60e); MA arising retrolaterally on tegulum, clavate, with distal sclerotized hook (fig. 60b). Epigynum with recurved LTR, PML oval, posterior margin projecting (fig. 61c, d); each spermatheca a longitudinal cylindrical capsule, copulatory ducts posteromedian, with external spiraled afferent duct and straight internal efferent duct leading to chamber in posterior dorsal lobe, fertilization duct posterior (fig. 11a).

COMPOSITION: Two species.

DISTRIBUTION: Extreme southwestern Cape Province, South Africa (fig. 110).

Malaika longipes (Purcell)
Figures 3b, 4b, 6d, 15f,
16d, 59a, b, 60a–f,
61a–d, 62a–e, 68c, 110

Auximus longipes Purcell, 1904: 132 (lectotype female, here designated, from Devils Peak (near waterfall), Cape Peninsula, South Africa, coll.

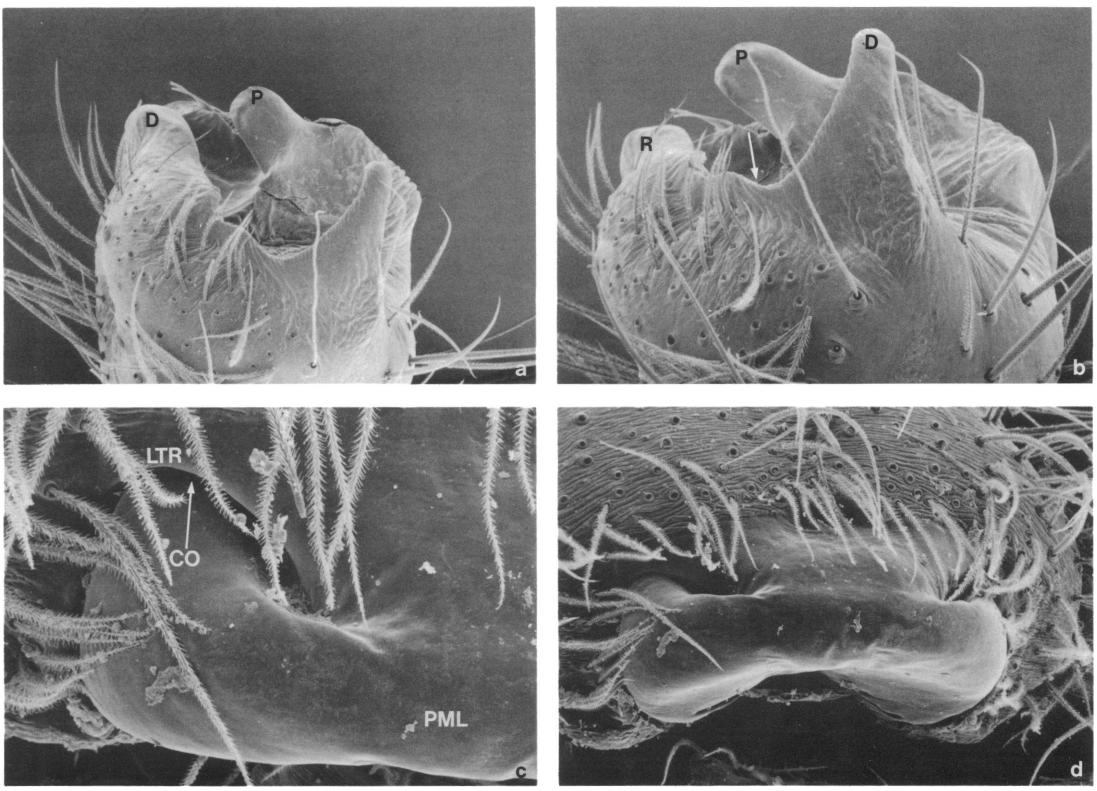

Fig. 61. *Malaika longipes* (Purcell), Skeleton Gorge. **a, b.** Male palpal tibia. **c, d.** Female epigynum. R = retrodorsal tibial lobe; D = dorsal tibial process; P = prolateral tibial process; LTR = lateral transverse ridges; CO = copulatory opening; PML = posterior median lobe of epigynum. Arrow points to ridge connecting D and R.

4/96, W. J. P., SAM 752, examined). – Roewer, 1954: 1361. – Bonnet, 1955: 824.

Malaika longipes: Lehtinen, 1967: 246.

Haemilla grindleyi Lawrence, 1964: 58 (female holotype from Table Mountain, South Africa, SAM, examined). – NEW SYNONYMY.

Phyxelida grindleyi: Brignoli, 1983: 528.

NOTE: Purcell (1904: 132) described this species from "A number of ♀♀, ♂♂ and young from the Cape Peninsula (mostly found in the moister ravines on the slopes of the mountains)." Of these specimens the South African Museum has an adult female from Devils Peak (SAM 752) which Lehtinen had labeled as a syntype. Also from the South African Museum are an adult male and juvenile male from Simonstown (SAM B1971) which Lehtinen had labeled "lectotype." The label accompanying the adult male and juvenile male written in Purcell's own hand states that the specimens were collected in "6/09" and therefore these specimens, collected 5 years after the description of *Auximus longipes* Purcell, could not be syntypes. The female from Devils Peak was collected in "4/96." Because this date of collection is prior to the publication of *Auximus longipes* Purcell, I consider this to be a syntype and designate this female as the lectotype.

DIAGNOSIS: Male palpus as in figure 62a, c, apex of conductor acutely pointed, directed retrolaterad, reservoir visible through tegulum as a simple, tight loop; palpal tibia as in figure 62b, P process a stout, broad, dorsal directed flange, D process conical, shorter than in *M. delicatula*, R lobe produced and sclerotized; palpal coxa with dorsolateral basal triangular projection. Female with epigy-

num as in figure 62e, PML with posterior margin recurved and projecting, spermathecae as in figure 62d, each with afferent duct making 8 or more external spirals.

MALE (Kirstenbosch): Total length 6.88. Carapace pale yellow-brown, pars thoracica with short, dusky radii, pars cephalica with broad, faint, dusky v-shaped mark anteriad of thoracic fovea and faint reticulations extending to ocular area; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae, sternum, labium, coxae, trochanters, legs, and palpi yellow-white, sternum, labium, and coxae with dusky maculations; abdomen yellow-white, dorsum with anterior longitudinal dark bands, median and posterodorsal broad dark chevrons, sides with oblique longitudinal maculations, venter gray-brown with paired light longitudinal bands, between these a few light spots. Carapace 3.13 long, 2.56 wide, margin entire; thoracic fovea deep, narrowed posteriorly, length 0.18 carapace; clypeus 0.22 high; ocular area 0.37 long, 0.82 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.45:1.27:1.55, diameter of PM 0.11; AM separated by their diameter, separated from AL by AM diameter; PM separated by 1⅙ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ⅙ PL diameter. Chelicerae 1.20 long, slender, smooth, promargin of fang furrow with 2 or 3 minute and 4 large teeth, retromargin with 6 large and 2 minute teeth. Sternum 1.69 long, 1.44 wide, broad anteriorly, apex pointed; labium 0.66 long, 0.50 wide; palpal coxa 1.03 long, 0.47 wide, with dorsolateral basal triangular projection. Femur I length 1.71 times carapace width; metatarsus I (fig. 59a, b) slightly flattened dorsoventrally at base, legs otherwise unmodified. Spination: palpus: femur d0-0-1, patella d0-1; leg I: femur d1-1-0-1, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-1-2, r0-1-1-0, metatarsus p1-0-0-1, v2-2-0-1, r1-0-0-1; leg II: femur d1-1-0-1, p0-0-1-1, r0-1-0-1, tibia p, v0-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg III: femur d1-1-0-1, p0-1-1-1, r0-1-1-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-1-2, v2-1-1, r1-1-1-2; leg IV: d1-1-0-1, p0-0-0-1, r0-0-1-1, tibia d1-0-0-0, p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.38	3.81	3.31	4.44	1.50
Patella	1.38	1.25	1.19	1.25	0.56
Tibia	4.19	3.00	2.56	4.00	0.44
Metatarsus	4.69	3.25	2.94	4.25	–
Tarsus	1.88	2.19	1.31	1.63	1.81
Total	16.52	13.50	11.31	15.57	4.31

Palpal femur with basal group of 5 and row of 3 slender anterobasal setae, these becoming shorter distally and with bases enlarged; tibia as in figure 62b, P process a stout, broad, dorsad directed flange, D process conical, R lobe produced and sclerotized; palpal bulb as in figure 62a, c, origin of embolus and lamellar pars pendula basal, conductor larger than tegulum, ventral margin of apical embolic groove of conductor crenulate, apex of conductor acutely pointed, directed retrolaterad, reservoir visible through tegulum as a simple, tight loop, MA arising retromedially on tegulum, clavate, with hooked apex.

VARIATION: Total length 5.31–8.50. Carapace length 1.21–1.31 times width; thoracic fovea 0.18–0.27 length carapace; PER width 1.09–1.16 times AER, 2.21–2.41 times OAL; OQP 1.34–1.53 times OQA, 1.02–1.16 times OQL; cheliceral length 5.36–5.83 times clypeal height, promargin of fang furrow with 6–8, retromargin with 7 or 8 teeth; sternum length 1.14–1.24 times width; labium length 1.23–1.31 times width. Legs uniform or with dusky annuli: especially basal, median and subapical on femora III and IV. Femur I length 1.71–2.00 times carapace width. Dorsum of abdomen light with dark diagonal bands, or dark surrounding light diagonal markings.

FEMALE (Kirstenbosch): Total length 6.06. Markings of cephalothorax, legs, palpi, and abdomen about as in male, except darker. Legs III and IV annulate: femora with basal, median, and subapical, patellae with apical, and tibiae with median and subapical faint dusky annuli. Carapace 2.88 long, 2.06 wide; thoracic fovea length 0.17 carapace; clypeus 0.26 high; ocular area 0.32 long, 0.88 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.45:1.45:

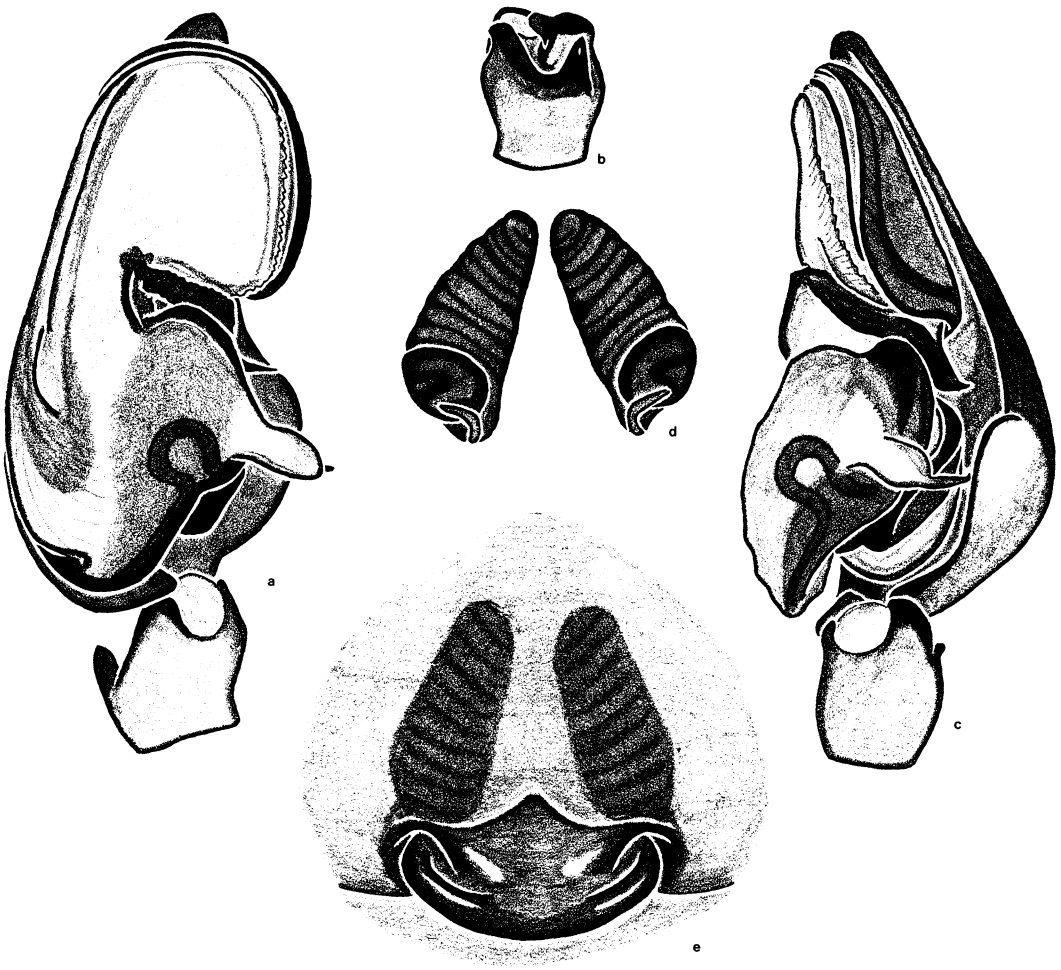

Fig. 62. *Malaika longipes* (Purcell), Skeleton Gorge. a–c. Male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. **d.** Female spermathecae, dorsal. **e.** Female epigynum, ventral.

1.25, diameter of PM 0.13; AM separated by their diameter, separated from AL by 1¼ AM; PM separated by 1⅛ their diameter, separated from PL by 1⅝ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.41 long, robust, smooth, promargin of fang furrow with 4 minute, 3 large, and 1 minute teeth, retromargin with 5 large and 3 minute teeth. Sternum 1.47 long, 1.28 wide, as in male; labium 0.59 long, 0.53 wide; palpal coxa 0.91 long, 0.53 wide. Femur I length 1.64 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-1, tibia d0-0-1, p0-1-1-0, tarsus p2-1-1, v1-0-3-2-2, r1-1-1; leg I: femur d1-0-1-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v0-0-1-1, r0-1-1-0, metatarsus p1-0-0-1, v2-0-2-1, r1-0-0-1; leg II: femur d1-1-0-1, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-0-0-2, v2-0-2-1, r1-0-0-2; leg III: femur d1-1-0-1, p0-1-0-1, r0-1-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-1, p0-0-0-1, r0-0-1-1, tibia d1-0-0-0, p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-0-0-2. Palpal femur with

basal group of several slender setae and row of 3 slender anterobasal setae in enlarged bases. Calamistrum origin at 0.53 from metatarsus base, length 0.28 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.38	2.75	2.44	3.31	1.19
Patella	1.06	0.94	0.88	1.00	0.50
Tibia	3.19	2.19	1.81	2.69	0.69
Metatarsus	3.13	2.25	2.06	2.94	–
Tarsus	1.50	1.19	1.19	1.25	1.88
Total	12.26	9.32	8.38	11.19	4.26

Epigynum as in figure 62e, with recurved LTR, copulatory openings hidden medially, epigynal plate with transverse, sinuate ridge, PML oval, posterior margin rebordered, recurved and projecting; spermathecae as in figure 62d, each a longitudinal cylindrical capsule with posterior, dorsal lobe, afferent duct making 8 or more external spirals and straight internal efferent duct leading to chamber in posterior lobe.

VARIATION: Total length 3.88–9.38. Carapace length 1.39–1.45 times width, markings distinct to obscure; thoracic fovea 0.14–0.20 length carapace; PER width 1.13–1.17 times AER, 2.64–3.08 times OAL; OQP 1.41–1.54 times OQA, 1.18–1.36 times OQL; cheliceral length 5.10–6.50 times clypeal height, promargin of fang furrow with 6–8, retromargin with 5–8 teeth; sternum length 1.02–1.17 times width; labium length 0.92–1.35 times width; palpal femur with 2 or 3 anterobasal thorns, or slender setae only. Markings of legs vary: may be uniform with metatarsi I and II darker, or weakly to strongly annulate—femora with basal, median, and apical, patellae with apical, and tibiae and metatarsi with subbasal and apical annuli. Abdomen dark with dorsal pairs of light, diagonal bands, or light with anterodorsal dark area and median and posterior paired dark marks.

NATURAL HISTORY: I have collected these spiders beneath rocks and logs in moist, cool-temperate forests behind the Kirstenbosch Botanical Garden on Table Mountain. *Malaika longipes* are the commonest cribellate spiders in this habitat, and have also been taken in nearby caves. Subadult males collected in October near the end of the rainy season subsequently molted to maturity in captivity .

DISTRIBUTION: Forests on the slopes of mountains on the Cape Peninsula, South Africa (fig. 110).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Wynberg Caves, Table Mountain, Aug. 1956 (J. R. Grindley, SAM), 1♀ (*Haemilla grindleyi* Lawrence, holotype); Table Mountain, Cape Town, Kirstenbosch Botanical Garden, Nov. 1960, (N. Leleup, MRAC), 1♂, 5♀, Skeleton Gorge, elev. 800–1000 ft, indigenous forest, Jan. 4,7, 1985 (C. E. Griswold & T. Meikle-Griswold, NMSA), 3♀, Oct. 26–29, 1985 (C. E. Griswold, T. Meikle-Griswold, & J. T. Doyen, NMSA), 5♂ (molted), 12♀; Table Mountain, Newlands, Nov. 15, 1925 (AMNH), 1♀; Constantia, Dec. 1960 (N. Leleup, MRAC), 1♀; Muizenburg, Kalkbay, Dec. 1960, primary forest, (N. Leleup, MRAC), 2♂; Kalk Bay Caves, July 1932 (SAM), 1♀; Simonstown, June 1909 (W. F. Purcell, SAM), 2♂; Devils Peak (near waterfall), April 1896 (W. F. Purcell, SAM), 1♀ (*Auximus longipes* Purcell, syntype).

Malaika delicatula, new species

Figures 11a, 63a–e, 110

TYPES: Holotype male and paratype female from Lourensford, Hottentots Holland, Stellenbosch Division, Cape Province, South Africa (Dec. 1901; W. F. Purcell), deposited in SAM.

ETYMOLOGY: The specific name is from the Latin *delicatus*, or dainty.

DIAGNOSIS: Male palpus as in figure 63a, c, apex of conductor acutely pointed, directed retrolaterad, reservoir visible through tegulum as a simple, tight loop; palpal tibia as in figure 63b, P process a slender, dorsal directed flange, D process stout, longer and broader than in *M. longipes*, R lobe unmodified; palpal coxa with basal dorsolateral triangular projection. Female with epigynum as in figure 63e, PML with posterior margin recurved and projecting, spermathecae as in figures 11a and 63d, afferent ducts making fewer than 7 external spirals.

MALE (holotype): Total length 5.38. Entire specimen faded to yellow-white, no markings except sclerotized palpal tibial apophysis. Carapace 2.69 long, 2.43 wide, margin entire; thoracic fovea long, narrow, deep, 0.14 car-

apace length; clypeus 0.24 high; ocular area 0.31 long, 0.77 wide; ratio of eyes AM:AL: PM:PL, 1.00:1.50:1.33:1.50, diameter of PM 0.13; AM separated by 3/5 their diameter, separated from AL by 1/3 AM; PM separated by 3/4 their diameter, separated from PL by 4/5 PM; lateral eyes nearly contiguous. Chelicerae 1.05 long, slender, concave laterally, smooth, promargin of fang furrow with 5 or 6, retromargin with 4 large teeth and 1 small tooth. Sternum 1.81 long, 1.44 wide, base broad, truncate, margin entire, apex pointed; labium 0.56 long, 0.47 wide; palpal coxa 0.94 long, 0.44 wide, with basal dorsolateral triangular projection. Legs elongate, unmodified, femur I length 1.85 times carapace width. Spination: palpus: femur d0-0-1; leg I: femur d1-1-0-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v0-0-2-2, r0-1-1-0, metatarsus p1-0-0-1, v2-0-2-1, r1-0-0-1; leg II: femur d0-1-0-0, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-2-2, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-1; leg III: femur d0-1-0-0, p0-1-0-1, r0-0-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p1-1-0-2, v1-0-1-2, r1-1-0-2, metatarsus p1-0-1-2, v2-1-1-1, r0-1-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	4.31	3.81	3.19	4.13	1.25
Patella	1.19	1.06	0.94	1.06	0.50
Tibia	4.19	3.25	2.50	3.75	0.44
Metatarsus	4.69	3.38	2.81	4.25	—
Tarsus	1.88	1.38	1.38	1.56	1.75
Total	16.26	12.88	10.82	14.75	3.94

Palpal femur with row of 2 slender anterobasal thorns in enlarged bases; tibia as in figure 63b, P process a long, slender, dorsad directed lobe, D process stout, weakly conical, R lobe not produced; palpal bulb as in figure 63a, c, origin of embolus and lamellar pars pendula basal, conductor larger than tegulum, ventral margin of apical embolic groove of conductor crenulate, apex of conductor acutely pointed, directed retrolaterad, reservoir visible through tegulum as a simple, tight loop, MA arising retromedially on tegulum, clavate, with hooked apex.

FEMALE (paratype): Total length 6.00. Faded as in male. Carapace 2.69 long, 2.19 wide; thoracic fovea 0.17 length carapace; clypeus 0.35 high; ocular area 0.32 long, 0.94 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.50:1.33: 1.50, diameter of PM 0.13; AM separated by 1/2 their diameter, separated from AL by 2/3 AM; PM separated by their diameter, separated from PL by 1 1/3 PM; lateral eyes separated by 1/8 PL diameter. Chelicerae 1.48 long, robust, promargin of fang furrow with 6, retromargin with 5 large teeth and 1 small tooth. Sternum 1.56 long, 1.34 wide, as in male; labium 0.63 long, 0.50 wide; palpal coxa 0.94 long, 0.50 wide, simple. Femur I length 1.63 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-1, p0-1-0, tibia p1-0-2, tarsus p1-1-2-0, r0-0-1-1; leg I: femur d1-1-0-0, p0-1-1-1, r0-0-0-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, r0-1-1-1, tibia p0-1-1-0, v2-0-1-2, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg III: femur d1-1-0-0, p0-0-1-1, r1-1-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v1-1-1-2, r0-0-1-0, metatarsus p1-1-0-2, v2-0-1-1, r1-0-1-2. Palpal femur with row of 3 slender anterobasal thorns in enlarged bases. Calamistrum origin at 0.54 from metatarsus base, length 0.20 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.56	3.06	2.69	3.56	1.38
Patella	1.19	1.00	0.94	1.06	0.56
Tibia	3.25	2.38	2.06	3.00	0.69
Metatarsus	3.38	2.50	2.19	3.25	—
Tarsus	1.44	1.31	1.19	1.25	1.50
Total	12.82	10.25	9.07	12.12	4.13

Epigynum as in figure 63e, with recurved LTR, copulatory openings hidden medially, epigynal plate with transverse, sinuate ridge, PML oval, posterior margin rebordered, recurved, and projecting; spermathecae as in figures 11a and 63d, each a longitudinal cylindrical capsule with posterior, dorsal lobe, afferent duct making 6 external spirals and straight internal efferent duct leading to chamber in posterior lobe.

DISTRIBUTION: Hottentot's Holland Mountains of the southwestern Cape Province, South Africa (fig. 110).

ADDITIONAL MATERIAL EXAMINED:

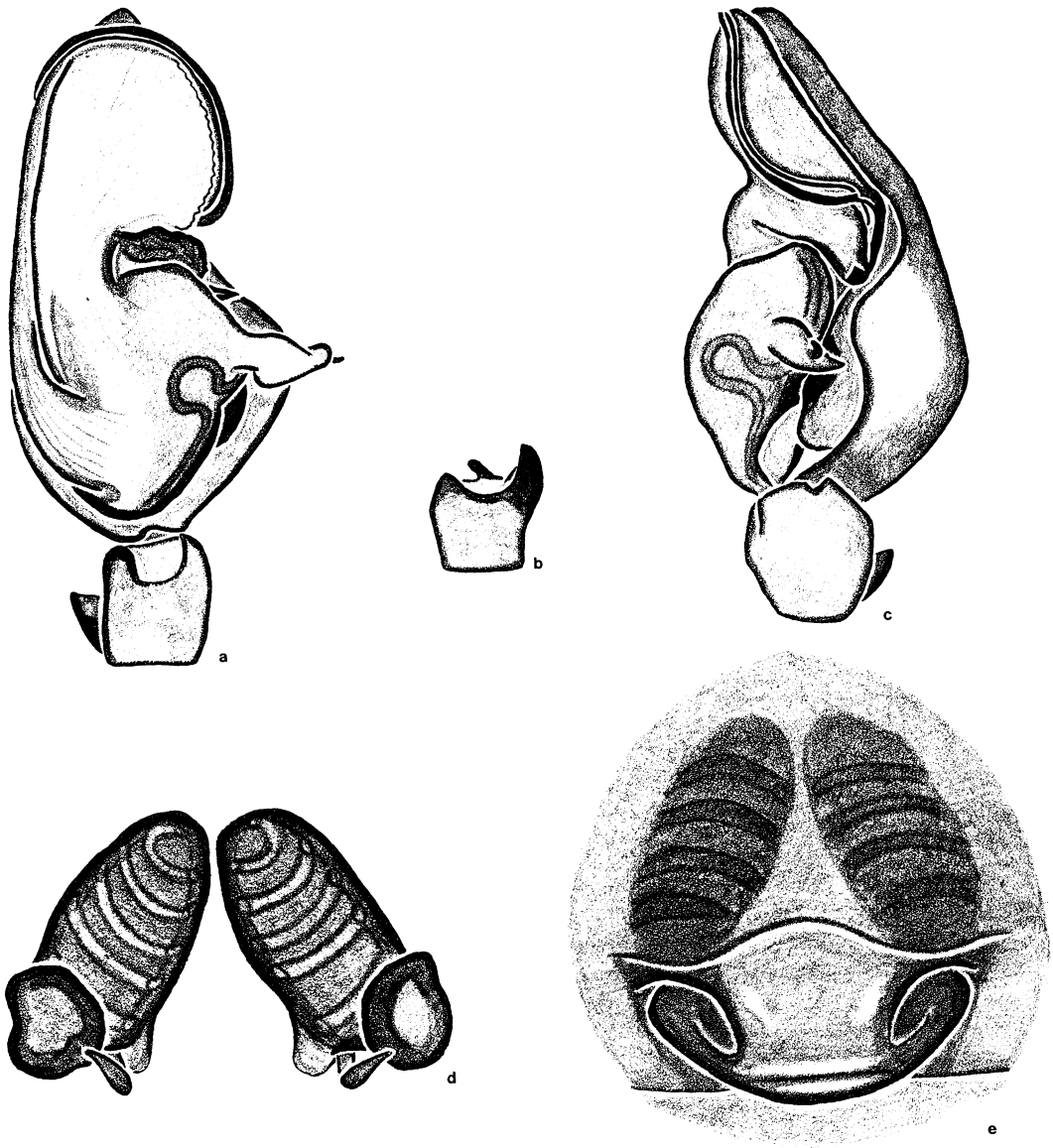

Fig. 63. *Malaika delicatula*, new species. a–c. Holotype, male palpus. d, e. Paratype female. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. **d.** Spermathecae, dorsal. **e.** Epigynum, ventral.

SOUTH AFRICA: *Cape Province*: Sir Lowry's Pass, summit, Hottentot's Holland Mountains, Stellenbosch Div., July 1899 (H. Herman, SAM), 1♀.

KULALANIA, NEW GENUS

TYPE SPECIES: *Kulalania antiqua*, new species.

ETYMOLOGY: The generic name refers to the occurrence of these spiders in the remote Kulal Mountains of northern Kenya, and is feminine in gender.

DIAGNOSIS: Epigynum with copulatory openings broad, triangular, anterior margins converging anteromedially (fig. 64c); thoracic fovea broad, length less than 4 times width; each spermatheca with bursa large, translucent, hornlike, leading into large, hyaline af-

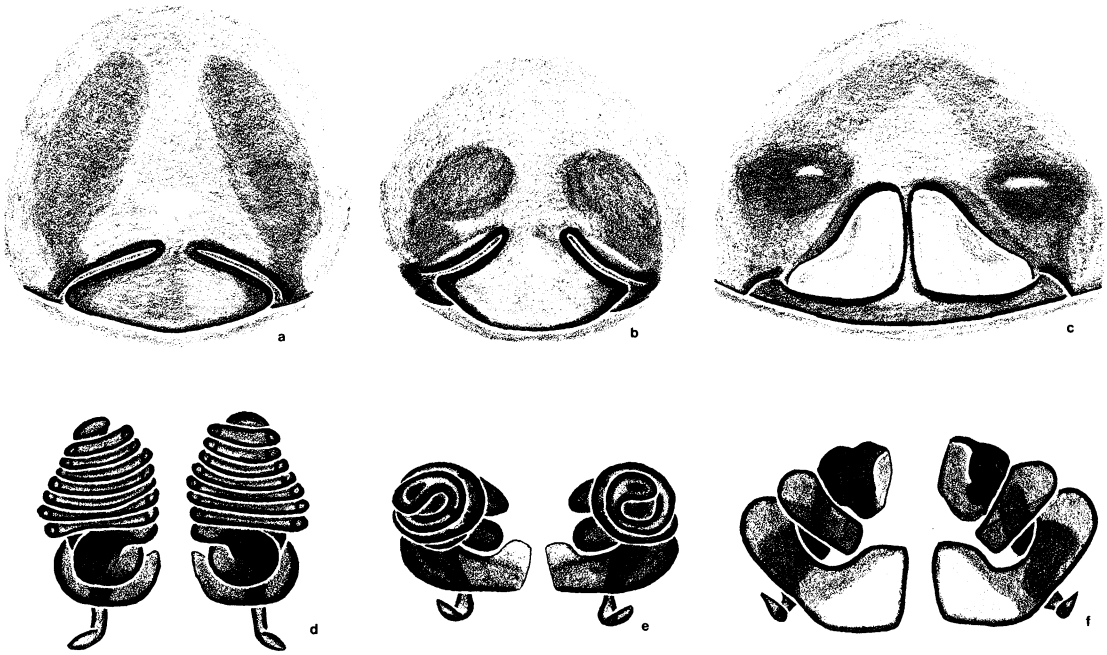

Fig. 64. Phyxelidinae, female genitalia. a, d. *Ambohima sublima*, new species, paratype. b, e. *Ambohima pauliani*, new species, holotype. c, f. *Kulalania antiqua*, new species, holotype. **a–c.** Epigyna, ventral. **d–f.** Spermathecae, dorsal.

ferent chamber making 2 complete spirals to anterior apex of spermatheca, and surrounding slender, sclerotized efferent chamber (fig. 64f).

DESCRIPTION: (see description of *Kulalania antiqua*, new species).

COMPOSITION: One species.

DISTRIBUTION: Kulal Mountains, Kenya (fig. 110).

Kulalania antiqua, new species

Figures 11b, 64c, f, 110

TYPES: Holotype female from leaf litter of *Juniperus* rain forest at an elevation of 1850 m on South Kulal (2°43′N; 36°46′E), Eastern Province, Kenya (Jan. 19, 1975, Å. Holm), deposited in UUZM; paratype female, same data, deposited in UUZM.

ETYMOLOGY: The specific name is from the Latin *antiquus*, or ancient.

DIAGNOSIS: Female with epigynum as in figure 64c, copulatory openings broad, triangular, separated by narrow median septum.

FEMALE (South Kulal): Total length 7.50. Carapace orange-brown, pars thoracica dark along margin and with submarginal maculations, pars cephalica with faint, dusky, v-shaped mark anteriad of thoracic fovea extending anteriad as faint line on each side; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae, labium, and palpal coxae red-brown, palpal coxae lighter at tips; sternum, coxae, and trochanters orange-brown, with faint dusky markings; legs and palpi dark yellow-brown, tibiae and metatarsi of legs with faint apical annuli; abdomen dark gray, dorsum with longitudinal series 5 of light chevrons, venter with broad, broken longitudinal light bands, area between these mottled with white. Carapace 3.62 long, 2.66 wide; thoracic fovea deep, narrowed posteriorly, length 0.16 carapace, broad, length less than 4 times width; clypeus 0.30 high; ocular area 0.32 long, 1.12 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.38:1.38:1.50, diameter of PM 0.18; AM separated by ½ their diameter, separated from AL by AM diameter; PM separated by their diameter, separated from PL by 1½ PM; lateral eyes separated by ⅙ PL diameter. Chelicerae 1.66 long, robust, straight-sided, smooth; promargin of fang furrow with 6 or

7, retromargin with 5 large and 2 or 3 minute teeth. Sternum 1.88 long, 1.59 wide, apex pointed; labium 0.72 long, 0.66 wide; palpal coxae 1.19 long, 0.72 wide. Femur I length 1.65 times carapace width. Spination: palpus: femur d0-0-0-1, patella d1-0-1, tibia d0-0-1, p0-1-1-0, tarsus p2-1-1, v1-1-2-3-2, r1-0-1; leg I: femur p0-1-1-1, r0-1-0-1, tibia p0-0-1-0, r0-0-1-0, metatarsus v2-0-2-1; leg II: femur d1-0-0-0, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg III: femur d1-0-0-0, p0-1-0-1, r0-1-0-0, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-1-1-1, r1-0-0-2. Metatarsi without apical combs. Palpal femur with 2 rows of 6 small, stout anterobasal thorns, ventral row stouter. Calamistrum origin at 0.47 from metatarsus base, length 0.31 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.38	3.68	3.19	4.06	1.50
Patella	1.44	1.94	1.13	1.31	1.50
Tibia	4.19	3.00	2.50	3.43	0.81
Metatarsus	4.19	3.19	2.69	3.62	–
Tarsus	1.63	1.38	1.25	1.44	1.63
Total	15.83	13.19	10.76	13.86	5.52

Epigynum as in figure 64c, copulatory openings broad, triangular, separated by narrow median septum, anterior margins converging anteromedially; PML very broad, trapezoidal, width more than 8 times length; spermathecae as in figures 11b, 64f, each with copulatory opening leading into large, hyaline afferent chamber making 2 complete spirals to anterior apex of spermatheca, and surrounding slender, sclerotized efferent chamber.

VARIATION: Total length 5.19–9.33. Markings of carapace obscure to clear, may have pars thoracica with short, dusky submarginal radii and marginal reticulations, pars cephalica with broad, dusky, v-shaped mark anteriad of thoracic fovea and dusky, longitudinal lines on each side extending anteriorly to posterior eyes; legs may be virtually unmarked or have strong apical annuli on patellae and tibiae, and may have median annuli on femora and tibiae III and IV. Carapace length 1.29–1.36 times width; thoracic fovea 0.13–0.19 length carapace; PER width 1.13–1.20 times AER, 2.71–3.50 OAL; OQP 1.26–1.53 times OQA, 1.24–1.35 times OQL; cheliceral length 4.94–6.30 times clypeal height, promargin of fang furrow with 6 or 7, retromargin with 6–8 teeth; sternum length 1.11–1.23 times width; labium length 1.00–1.10 times width; palpal femur with 1 or 2 rows of anterobasal thorns.

MALE: Unknown.

NATURAL HISTORY: The label data suggest that these spiders are restricted to montane wet forest.

DISTRIBUTION: Known only from the type locality in the isolated Kulal highlands of north central Kenya (fig. 110).

ADDITIONAL MATERIAL EXAMINED: KENYA: *Eastern*: South Kulal, SE side, Jan 21, 1975, elev. 1770 m, under stones at ravine in rain forest (Å. Holm, UUZM), 2♀, Jan. 20, 1975, elev. 1990 m, under stones at brook in forest (Å. Holm, UUZM), 1♀.

AMBOHIMA, NEW GENUS

TYPE SPECIES: *Ambohima sublima*, new species.

ETYMOLOGY: The generic name is an arbitrary combination of letters, and is feminine in gender.

DIAGNOSIS: Male with metatarsi I (fig. 66a, b, d) and II (fig. 66c) having prolateral, spinule-lined concavity at midsegment, at base of concavity a short, prolateral process surmounted by stout clasping spine; palpal bulb (fig. 65a, d) with conductor greatly hypertrophied, apex directed mesad, origin of embolus retrolateral, embolus concealed in conductor groove completely encircling bulb, median apophysis absent. Thoracic fovea broad, length less than 4 times length. Epigynum with broad, oval posterior median lobe (PML), copulatory openings slitlike and converging anteromedially (fig. 64a, b); spermathecae (fig. 64d, e) with bursae large, translucent, hornlike, afferent chamber leads to anterior spiraled duct making 2–8 turns to blind, ending apical bulb, linear efferent chamber originating at base of spiral, extending posteriad within spiral of afferent chamber.

DESCRIPTION: Medium size, total length 5.50–10.00. Carapace length 1.23–1.48 times width, thoracic fovea deep, broadly oval, length 2.00–3.75 times width, strongly limited at least anteriorly and laterally, length

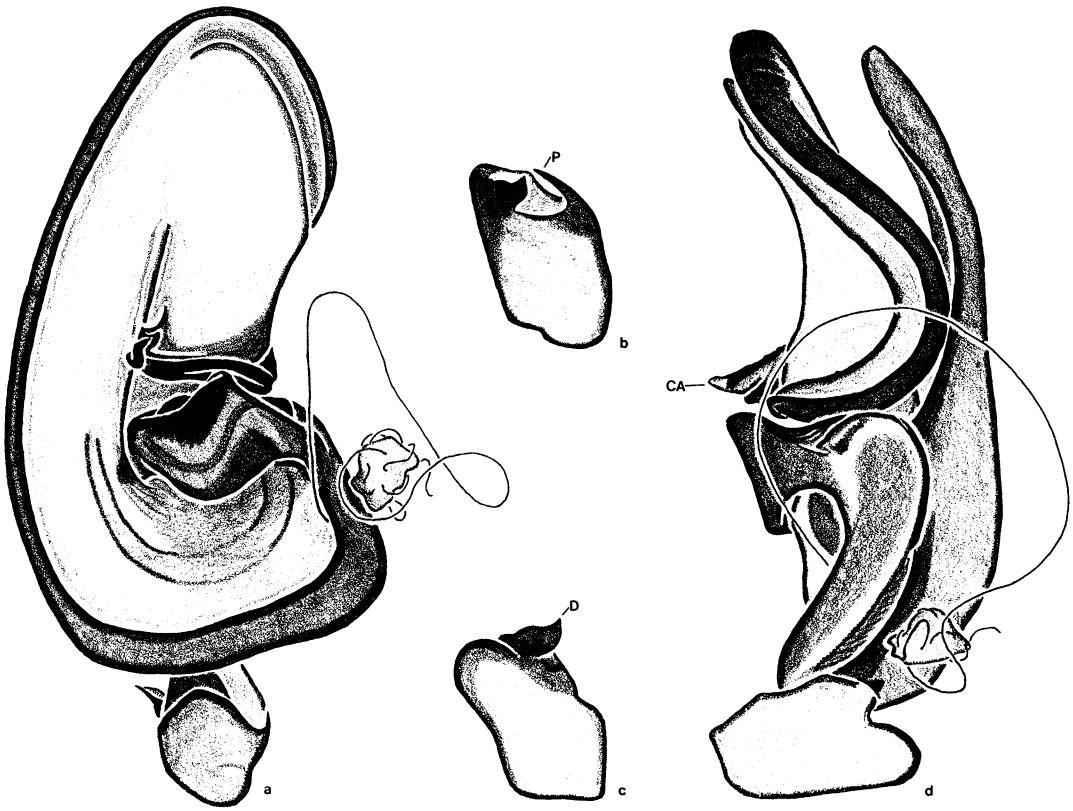

Fig. 65. *Ambohima sublima*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, prolateral. **c.** Tibia, dorsal. **d.** Tibia and tarsus, retrolateral. P = prolateral tibial process; D = dorsal tibial process; CA = conductor apex.

0.08–0.25 carapace length; PER straight to slightly recurved, AER straight, ocular area width 2.17–4.71 times length; clypeal height 1.70–2.67 times AM diameter; chelicerae smooth or with very weak wrinkles, length 4.94–6.00 times clypeal height, pro- and retromargins of fang furrow with 4–6 heterogeneous teeth; sternum length 1.18–1.35 times width, base narrowed, greatest width 1.37–1.52 times base width, apex often prolonged, pointed, a right angle, or blunt; labium broad, length 1.00–1.17 times width. Legs long to elongate, femur I 1.64–2.66 times carapace width; leg formula 1423; usually marked with bold annulations; male metatarsi I and II with prolateral, spinule-lined concavity at midsegment, at base of concavity a short, prolateral process surmounted by stout clasping spine (fig. 66a–d), legs otherwise unmodified; metatarsi lacking apical combs; calamistrum subapical, origin at 0.38–0.52 distance from metatarsus base, length 0.27–0.35 metatarsus length, pseudocalamistrum absent. Abdomen with posterior chevrons dorsally, venter with longitudinal bands narrow and entire. Palpal femur with anterobasal row of setae set in enlarged bases, at least some distal setae shortened and enlarged as thorns; male palpal tibia (fig. 65c) with sclerotized dorsal process (D), a prominent retrodorsal lobe, and dorsally prolonged prolateral (P) lobe (fig. 65b); cymbium narrowed for apical half; palpal bulb (fig. 65a) with tegulum central, much smaller than conductor, median apophysis absent; embolus a slender, threadlike spine, lamellar pars pendula large, conductor greatly hypertrophied, with embolic groove completely encircling bulb, apex (CA) directed mesad (fig. 65d). Epigynum with broad, oval to trapezoidal PML, copulatory openings slitlike or hidden beneath recurved lateral transverse ridges (LTR); spermatheca complex, usually

with anterior straight or spiral blind, ending duct, fertilization duct posterior.

COMPOSITION: Two species.

DISTRIBUTION: Madagascar (fig. 110).

Ambohima sublima, new species

Figures 64a, d, 65a–d, 66a–d, 110

TYPES: Holotype male and paratype female from Ambohimanga Village (18°44'S; 47°34'E), Tananarive District, Madagascar (Dec. 1959; R. Legendre), deposited in MNHN.

ETYMOLOGY: The specific name is from the Latin *sublimis*, meaning exalted or distinguished.

DIAGNOSIS: Male metatarsi I and II with prolateral, spinule-lined concavity at midsegment, at base of concavity a short, prolateral process surmounted by stout clasping spine (fig. 66a–d); palpus as in figure 65a–d, conductor greatly hypertrophied, apex directed mesad, origin of embolus retrolateral, embolus concealed in conductor groove completely encircling bulb. Female with epigynum as in figure 64a, copulatory openings oblique, slitlike; spermathecae as in figure 64d, each with anterior spiraled duct making 8 turns to apical bulb.

MALE (holotype): Total length 5.94. Carapace orange-brown, margin of pars thoracica dusky, with broad, dusky, v-shaped mark anteriad of thoracic fovea and dusky longitudinal band on each side extending anteriorly along pars cephalica, with dusky reticulations laterad of eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae, sternum, labium, coxae, legs and palpi yellow-brown, sternum dusky, labium and palpal coxa lighter near tips, legs unmarked; abdomen gray-brown, dorsum with anterior light longitudinal mark which is narrowed posteriorly with lateral extensions, venter with pair of bold, entire, longitudinal light bands. Carapace 2.81 long, 2.28 wide, margin entire; thoracic fovea broad, deep, narrowed posteriorly, length 0.20 carapace; clypeus 0.21 high; ocular area 0.38 long, 0.83 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.27:1.33:1.47, diameter of PM 0.16; AM separated by ⅔ their diameter, separated from AL by ⅔ AM; PM separated by ¾ their diameter, separated from PL by ⅘ PM; lateral eyes separated by ⅙ PL. Chelicerae 1.12 long, slender, smooth, promargin of fang furrow with 6, retromargin with 5 large teeth and 1 minute tooth. Sternum 1.53 long, 1.28 wide, apex pointed; labium 0.56 long, 0.50 wide; palpal coxa 0.94 long, 0.44 wide. Legs elongate, femur I length 2.66 times carapace width; metatarsi I and II with prolateral, spinule-lined concavity at midsegment, at base of concavity a short, prolateral process surmounted by stout clasping spine (fig. 66a–d); otherwise unmodified. Spination: palpus: femur d0-0-0-1; leg I: femur p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v1-0-1-0, r0-1-1-0, metatarsus p0-1-0-1, v1-1-1-1, r0-1-0-1; leg II: femur d1-0-1-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p0-1-0-1, v2-2-0-1, r0-; leg III: femur p0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-2, v2-2-0-1, r0-1-0-2; leg IV: femur d1-0-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus v2-1-1-2. Leg measurements:

	I	II	III	IV	Palp
Femur	3.03	2.59	2.19	2.81	0.94
Patella	0.66	0.56	0.56	0.56	0.31
Tibia	3.22	2.41	1.81	2.59	0.31
Metatarsus	3.16	2.28	1.97	2.81	—
Tarsus	1.28	1.00	0.84	1.03	1.31
Total	11.35	8.84	7.37	9.80	2.87

Palpal femur with row of 5 slender, anterobasal setae set in enlarged bases, distal 2 short, stout, thornlike; tibia with dorsal process (D) broad, bladelike, apically pointed (fig. 65c), R a prominent, blunt lobe, and with a small, slender, curved, pointed, dorsad-directed P process at prolateral base of cymbium (fig. 65b); cymbium narrowed for apical half; palpal bulb (fig. 65a) with tegulum central, much smaller than conductor, reservoir visible through tegulum as a transverse meander; embolus threadlike, origin retromedian, making 1 complete turn around bulb, apex retromedian, lamellar pars pendula large, lightly sclerotized; conductor greatly hypertrophied, with embolic groove completely encircling bulb, apex (CA) twisted, directed mesad (fig. 65d).

FEMALE (paratype): Total length 6.94. Carapace orange-brown, shading to dusky laterally, pars cephalica shading anteriorly to red-brown; black pigment surrounding each eye and extending between lateral eyes; car-

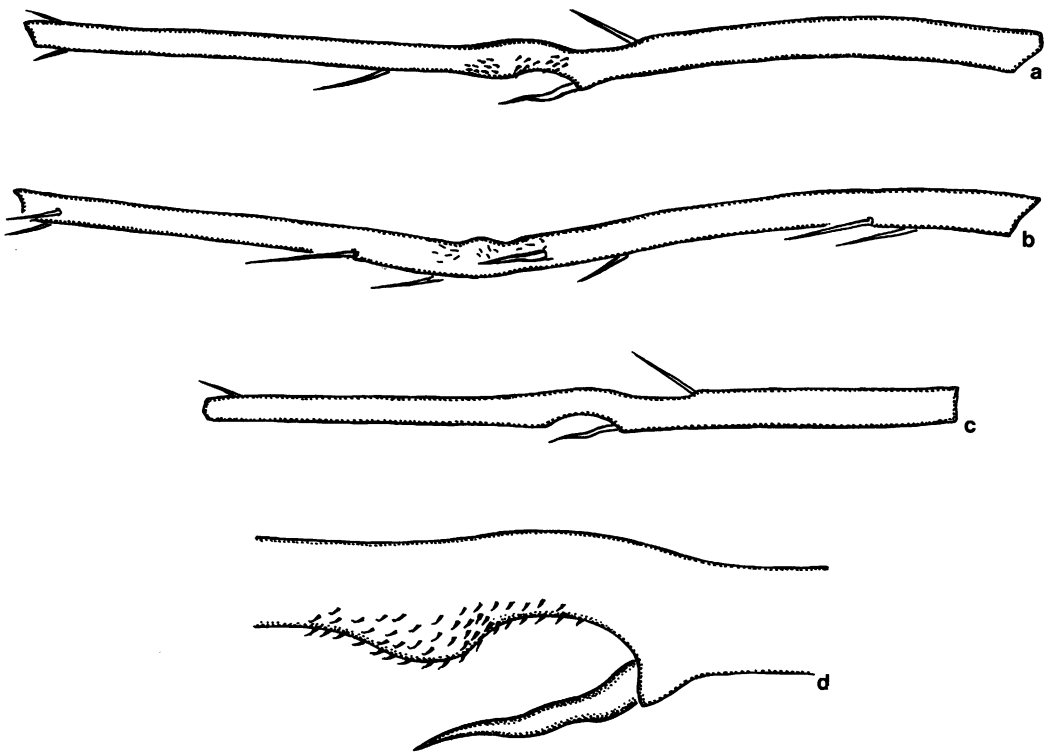

Fig. 66. *Ambohima sublima*, new species, holotype, right male metatarsi. **a.** I, dorsal. **b.** I, prolateral. **c.** II, dorsal. **d.** I, close-up of concavity, dorsal.

apace dark red-brown, boss yellow-brown; sternum, labium, and palpal coxa red-brown; legs and palpi orange-brown, palpal tarsus and distal half of tibia-tarsus I red-brown; abdomen gray, dorsum with median longitudinal light band crossed by posterodorsal chevrons, sides with oblique longitudinal light and dark mottling, venter with pair of faint longitudinal light bands. Carapace 3.38 long, 2.53 wide; thoracic fovea deep, narrowed posteriorly, length 0.19 carapace; clypeus 0.27 high; ocular area 0.22 long, 1.06 wide, PER weakly procurved; ratio of eyes AM:AL:PM:PL, 1.11:1.28:1.00:1.05, diameter of PM 0.14; AM separated by ⅔ their diameter, separated from AL by ⅔ AM; PM separated by 1¼ their diameter, separated from PL by 1⅓ PM; lateral eyes separated by ⅛ PL. Chelicerae 1.34 long, robust, smooth, promargin of fang furrow with 6, retromargin with 3 or 4 large and 1 or 2 minute teeth. Sternum 1.81 long, 1.53 wide, apex prolonged, blunt; labium 0.66 long, 0.59 wide; palpal coxa 1.03 long, 0.59 wide. Femur I length 2.22 times carapace width. Spination: palpus: femur d0-0-0-1, patella d0-0-1, tibia d0-0-0-1, p0-1-1-0, tarsus p1-0-1-0, v0-0-1-2-1-2-3-2, r1-0-0-0-0; leg I: femur d1-0-0-0, p0-1-1-1, r0-0-1-1, tibia p0-1-1-0, v0-1-1-1, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d0-1-1-0, p0-1-1-1, r0-1-1-1-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p0-2-0-1, v2-2-0-1, r0-1-0-1; leg III: femur d1-0-1-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-0-0-1. Palpal femur with row of 4 short, slender anterobasal thorns. Calamistrum origin at 0.52 from metatarsus base, length 0.27 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.81	2.25	1.88	2.44	0.72
Patella	0.66	0.59	0.53	0.59	0.28
Tibia	2.66	1.88	1.44	2.09	0.38
Metatarsus	2.37	1.72	1.44	1.93	—
Tarsus	1.13	0.84	0.75	0.84	0.97
Total	9.63	7.28	6.04	7.89	2.35

Epigynum as in figure 64a, copulatory openings oblique, slitlike, PML trapezoidal, sides angled, posterior margin procurved; spermathecae as in figure 64d, each with posterior copulatory duct leading to broad, twisted afferent chamber which leads to anterior spiraled duct making 8 turns to apical blind, ending bulb, efferent duct arising at base of spiral and extending posteriad within curve of afferent chamber.

DISTRIBUTION: Known only from the highlands of central Madagascar (fig. 110).

ADDITIONAL MATERIAL EXAMINED: MADAGASCAR: *Fianarantsoa*: 7 km W Ranomafana, elev. 1100 m, 1–7 Nov. 1988 (W. E. Steiner, NMNH), 1♂.

Ambohima pauliani, new species
Figures 11c, 64b, e, 110

TYPE: Holotype female from Maroantsetra, Tamatave District, Madagascar (Sept.; R. Paulian), deposited in AMNH.

ETYMOLOGY: The specific name is a patronym in honor of the collector of the type.

DIAGNOSIS: Epigynum as in figure 64b, copulatory openings oblique, slitlike; spermathecae as in figures 11c and 64e, each with anterior spiraled duct making 2 turns to apical bulb.

FEMALE (holotype): Total length 9.69. Carapace orange-brown, pars thoracica with margin dusky and with dusky anteromedian and median reticulate markings widening toward margin and posteriorly; with broad, dusky, v-shaped mark anteriad of thoracic fovea extending anteriorly as line on each side of pars cephalica with extensions to AL and AM; reticulate dusky markings laterad of eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown, boss yellow-brown; labium and palpal coxa red-brown, lighter at tips; sternum, coxae, trochanters, legs and palpi orange-brown; sternum and coxae dusky. Legs with strong, dark annuli: with faint median and subapical on femur II, strong basal, median and apical on femora III and IV and tibiae II–IV, apical on patellae II–IV, and with basal and apical on metatarsi II–IV. Palpal femur and patella with apical annuli, tibia with dusky dorsal longitudinal markings, tarsus red-brown; abdomen gray-brown, sides mottled with light, with anterodorsal longitudinal broad light mark encompassing paired longitudinal dark bands, median dorsal chevron, venter with pair of bold, longitudinal, light bands, between these a few light spots. Carapace 4.18 long, 3.16 wide, margin weakly sinuate; thoracic fovea broad, deep, length 0.11 carapace; clypeus 0.32 high; ocular area 0.43 long, 1.28 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.20:1.00:1.20, diameter of PM 0.16; AM separated by ⅔ their diameter, separated from AL by AM diameter; PM separated by 1½ their diameter, separated from PL by 1 3/4 PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.84 long, with weak ventrolateral wrinkles, promargin of fang furrow with 6, retromargin with 5 large teeth and 1 minute tooth. Sternum 2.19 long, 1.63 wide, margin sinuate, apex pointed; labium 0.84 long, 0.72 wide; palpal coxa 1.39 long, 0.66 wide. Legs elongate, femur I length 2.29 times carapace width. Spination: palpus: femur d0-0-1, p0-0-1, patella d0-0-1, tibia d0-0-0-1, p0-1-1-0, tarsus p1-0-0-0, v0-1-0-1-2-3-3, r1-0-0-0; leg I: femur d1-0-1-0, p0-1-1-0, r0-1-0-0, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-1-1-1, r0-1-0-1; leg II: femur p0-1-1-1, r0-0-1-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p0-1-0-2, v1-1-1-1, r0-1-0-2; leg III: femur d1-1-1-0-0, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-1-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-0-1-2, v0-2-2-1, r1-0-0-2. Palpal femur with row of 4 anterobasal thorns becoming shorter distally, distal 2 stoutest. Calamistrum origin at 0.49 from metatarsus base, length 0.27 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.59	2.81	2.38	3.09	0.97
Patella	0.84	0.75	0.66	0.72	0.38
Tibia	3.38	2.34	1.78	2.47	0.50
Metatarsus	3.19	2.28	1.88	2.56	—
Tarsus	1.31	1.03	0.88	1.00	1.09
Total	12.31	9.21	7.58	9.84	3.24

Epigynum as in figure 64b, copulatory openings oblique, slitlike, PML trapezoidal, sides acutely angled, posterior margin recurved; spermathecae as in figures 11c and 64e, each

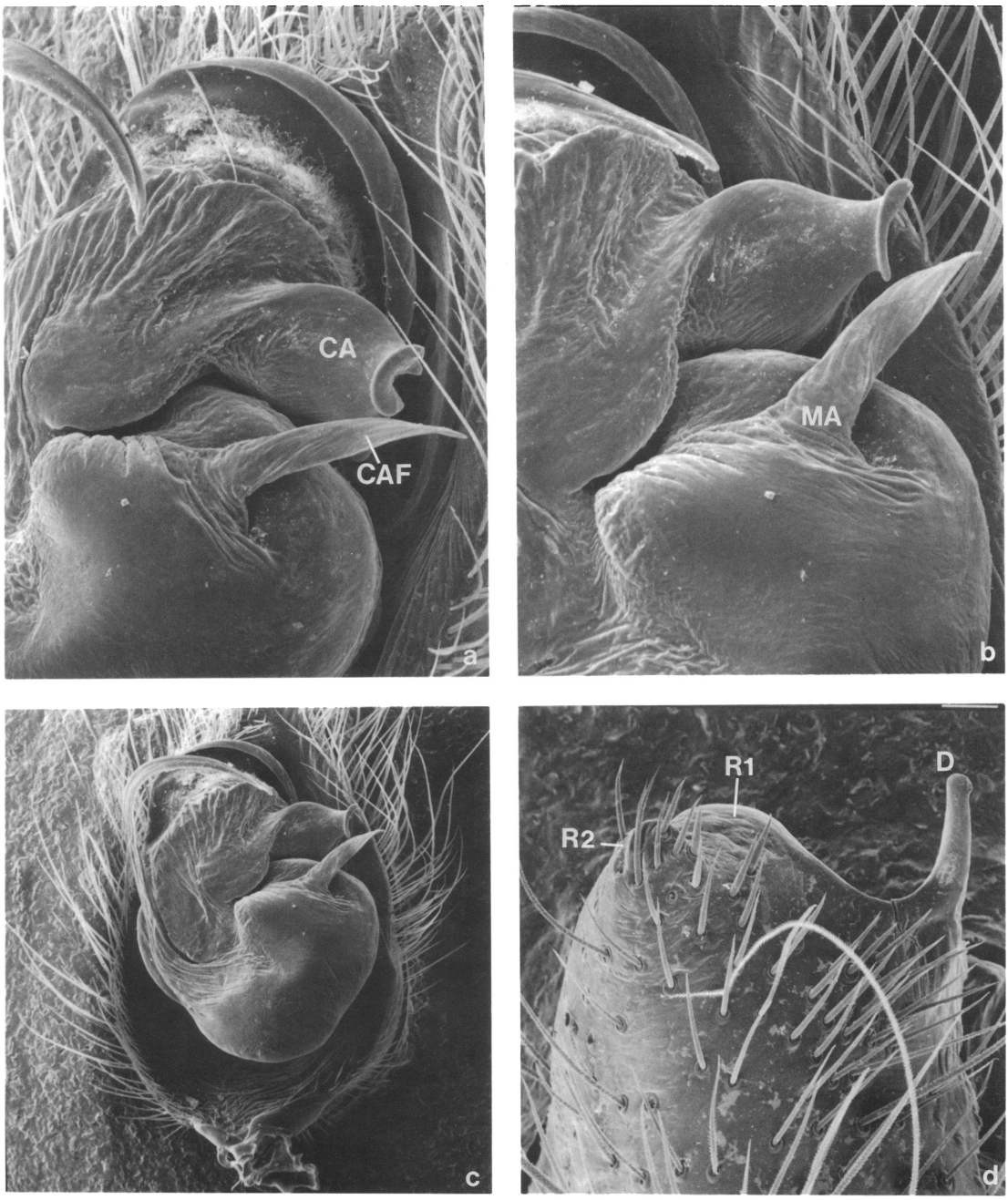

Fig. 67. *Themacrys silvicola* (Lawrence), Town Bush, male palpus. **a–c.** Bulb, ventral. **d.** Apex of tibia, dorsal. CA = conductor apex; CAF = subapical rounded flange; MA = median apophysis; D = dorsal tibial process; R1 = asetose, sclerotized retrodorsal lobe; R2 = setose retrodorsal lobe.

with posterior copulatory duct leading to twisted afferent chamber which leads to anterior spiraled duct making 2 turns to blind, ending apical bulb, linear efferent chamber originating at base of spiral, extending posteriad within spiral of afferent chamber.

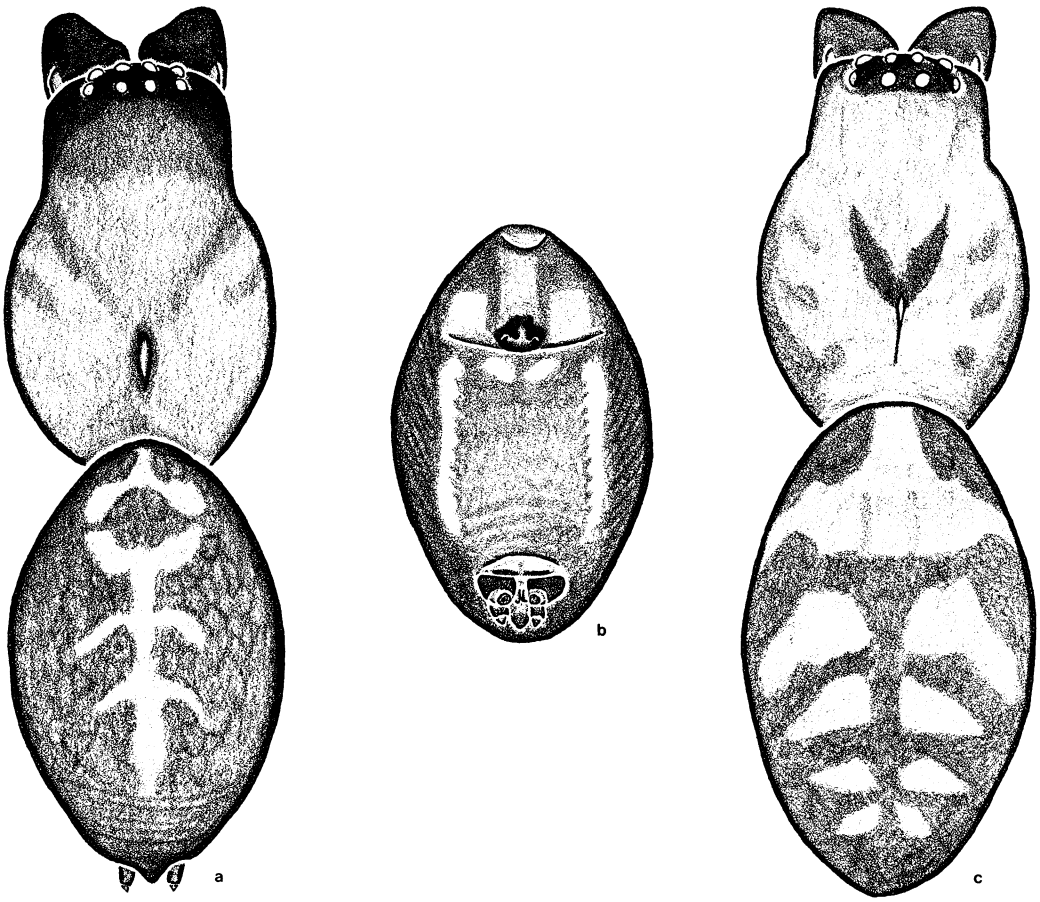

Fig. 68. Bodies of female Phyxelidinae. a, b. *Themacrys silvicola* (Lawrence), Town Bush. c. *Malaika longipes* (Purcell), Skeleton Gorge. **a, c.** Cephalothorax and abdomen, dorsal. **b.** Abdomen, ventral.

MALE: Unknown.

DISTRIBUTION: Known only from the type locality at the northern end of Antongil Bay on the north east coast of Madagascar (fig. 110).

THEMACRYS SIMON

Themacrys Simon, 1906: 287 (type species by subsequent designation *Themacrys irrorata* Simon, male and female syntypes in MNHN, not examined). – Bonnet, 1959: 4421. – Lehtinen, 1967: 269. – Brignoli, 1983: 528.
Themarcys: – Roewer, 1954: 1379 (lapsus).

DIAGNOSIS: Male palpal bulb with broad, lobate, desclerotized apical conductor (figs. 67a, c, 75a), with apical groove containing embolus, conductor apex retrolateral, with outer subapical rounded flange (CAF) (figs. 9, 67a); median apophysis (MA) flattened (fig. 67b), triangular, directed retrodistally; male palpal tibia (figs. 67d, 73b) with dorsal, sclerotized D process and a retrodorsal sector (R) divided into an inner, smooth sclerotized lobe (R1) and an outer, setose lobe (R2); epigynum (fig. 72a, b) with oval posterior median lobe (PML), copulatory openings beneath paired lateral transverse ridges (LTR), spermathecae (fig. 11d, 72c, d) simple, capsulate, with median afferent and lateral efferent chambers; thoracic fovea deep, linear, narrowed posteriorly (fig. 68a).

DESCRIPTION: Small to large spiders (figs. 1b, d, 68a, b), total length 4.5 to 16 mm. Body sparsely setose. Carapace length 1.33–1.56 times width; thoracic fovea length 0.10–0.25 times that of carapace, greater than 6

times width, long, deep and narrow, or broader, narrowed posteriorly (fig. 68a); ocular area width 2.39–3.48 times length; clypeal height 2.00–4.55 times AM diameter; chelicerae length 3.48–6.67 times clypeal height, chelicerae smooth, or with weak lateral and ventral wrinkles, or with strong, deep anterior, lateral, and ventral wrinkles or striae; promargin of fang furrow with 5 or 6 teeth, retromargin with 6–8 heterogeneous teeth. Sternum long, length 1.11–1.47 times width, base weakly to moderately narrowed, greatest width 1.55–2.20 times base width, apex usually less than a right angle, pointed, or rarely blunt; labium length 1.00–1.58 times width, base strongly notched. Legs short to elongate, femur I 1.15–2.97 times carapace width; leg formula 1423 or 4123; apical metatarsal combs absent; markings of legs usually uniform, but fresh or teneral specimens may have weak annuli, especially on posterior legs; calamistrum origin at 0.39–0.54 distance from metatarsus base, calamistrum length 0.20–0.38 that of segment; pseudocalamistrum absent; male leg I (figs. 8a, 71a–d) modified, metatarsus with clasping spine situated on retrolateral process, metatarsus with stout denticles; palpal femur usually with triangular patch of thorns (fig. 4e, f), or linear arrangement. Abdomen usually with dorsal, central longitudinal light band and crossbars (fig. 68a), rarely uniform, ventral bands bold and clear (fig. 68b), to faint or absent. Male palpal tibia with dorsal, sclerotized D process and 2 retrodorsal (R1 + 2) lobes (figs. 67d, 73b), a setose R2 and an asetose, smooth, sclerotized R1, variously modified, basal condyles prominent flanges (fig. 75a, c) at base of cymbium; palpal bulb (fig. 9) with spine-like embolus originating probasally and flattened detachable lamellar pars pendula (PP) associated with prolateral and apical part; conductor apical, broad, lobate, and desclerotized, with apical groove containing embolus, conductor apex (CA) sclerotized (fig. 67a, c), directed retrolaterad, with outer subapical rounded flange (CAF); MA (figs. 9, 67b) situated retroapically on tegulum, flattened, triangular, directed retrodistally; reservoir visible ventrally through tegular cuticle as open (fig. 77a) or tight (fig. 70a) loop. Epigynum (fig. 72a, b) with broad, oval posterior median lobe (PML), paired copulatory openings located at anteromedian margin of PML beneath paired lateral transverse ridges (LTR); spermathecae (figs. 11d, 72c, d, 74d, e) simple, capsulate, with median afferent and lateral efferent chambers, fertilization ducts posterior.

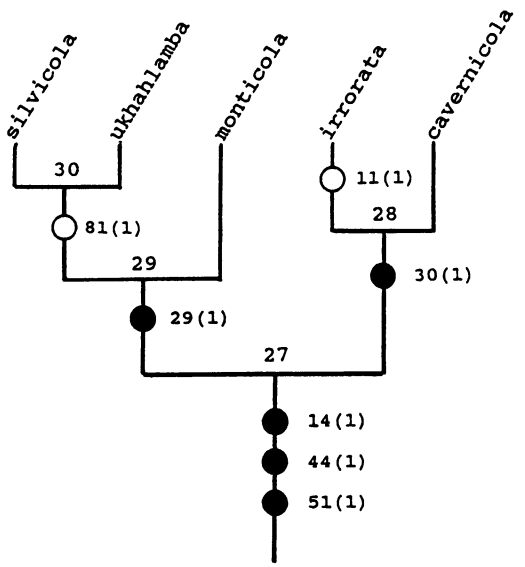

Fig. **69.** Cladogram for the species of *Themacrys* (shaded circles: unique synapomorphies; open circles: homoplasy).

COMPOSITION: Five species. Relationships among the species are depicted on the cladogram in figure 69.

DISTRIBUTION: Eastern South Africa (figs. 108, 109).

Themacrys silvicola (Lawrence)
Figures 1b, d, 4e, f, 8a–d, 9, 11d, 15c, 16c, 67a–d, 68a, b, 70a–c, 71a, b, 72a, c, 109

Haemilla silvicola Lawrence, 1938: 466 (male holotype from Pietermaritzburg, South Africa, NMSA, examined). – Roewer, 1954: 1367. – Bonnet, 1957: 2071.
Themacrys silvicola: Lehtinen, 1967: 270.

NOTE: Lehtinen (1967: 270) stated that a female specimen "described by Lawrence 1939 from Pietermaritzburg . . . (and) . . . labeled as type belongs to another species of *Themacrys*." The female (NMSA 1480) described by Lawrence (1939: 272) as the female of *T. silvicola* is clearly distinct from this species. The form of the epigynum and

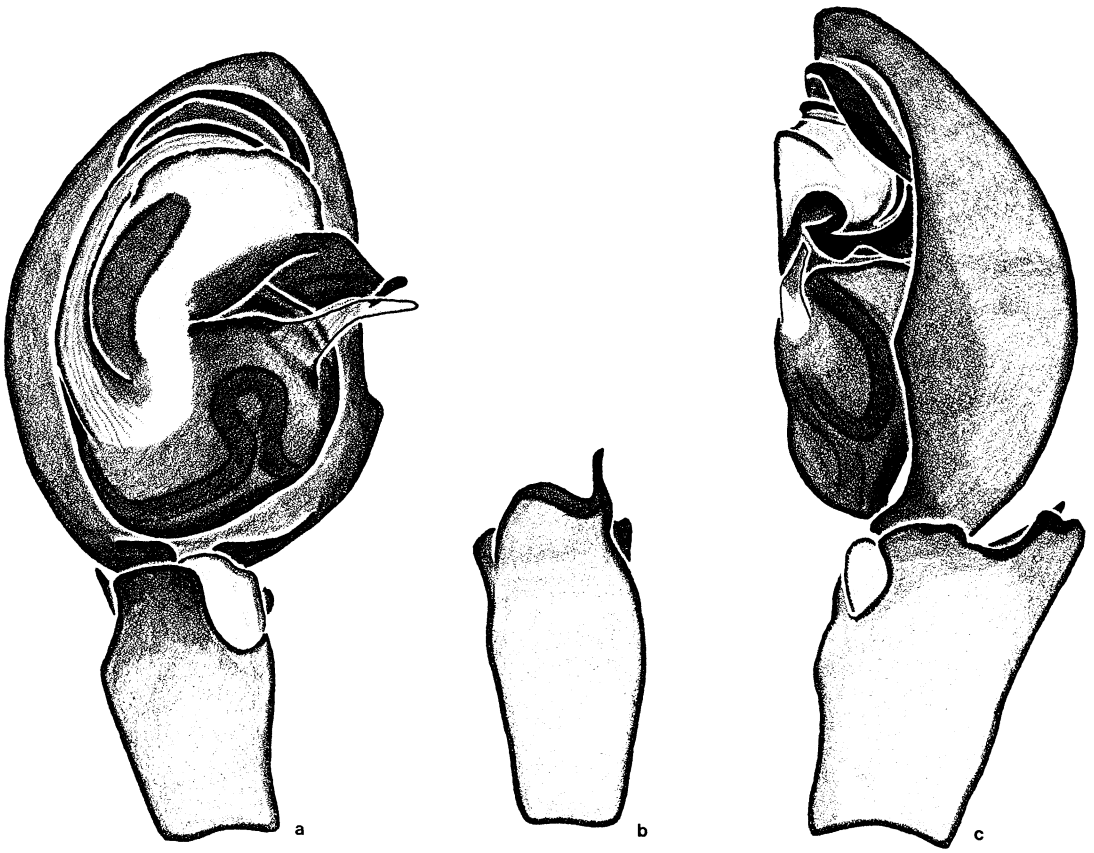

Fig. 70. *Themacrys silvicola* (Lawrence) (holotype of *Haemilla silvicola* Lawrence), male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

spermathecae and extremely long legs suggest *T. cavernicola* Lawrence, 1939. The specific distinctness of this specimen was first noted by Lehtinen (1967: 270).

DIAGNOSIS: Male metatarsus I with dorsal, spear-shaped, retromedian directed process (figs. 8b, c, 71a, b) set in ring of desclerotized cuticle, palpal tibia (fig. 70b) with dorsal D process long, slender, R weakly differentiated; epigynum (fig. 72a) with copulatory openings hidden beneath LTR, spermathecae contiguous or little separated (fig. 72c), distance between less than ⅓ length.

MALE (holotype): Total length 8.25. Carapace yellow-white, darker along margin of and anteriorly on pars cephalica; ocular area orange-brown, black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown, boss yellow-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-white, unmarked except metatarsus-tarsus I orange-brown; abdomen gray, dorsum with light longitudinal median band for entire length, anteromedian pair of white bars encircling dark area and 4 or 5 posterior chevrons, venter with pair of longitudinal light bands. Carapace 4.06 long, 3.03 wide, margin entire; thoracic fovea long, deep, length 0.19 carapace; clypeus 0.35 high; ocular area 0.45 long, 1.23 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.10:1.20:1.20, diameter of PM 0.16; AM separated by ¾ their diameter, separated from AL by ⅘ AM; PM separated by 1⅓ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 2.08 long, slender, weakly wrinkled anter-

oapically, laterally, and ventroapically, promargin of fang furrow with 5, retromargin with 5 large and 2 minute teeth. Sternum 1.94 long, 1.75 wide, narrowed anteriorly, margin sinuate, apex pointed; labium 0.81 long, 0.66 wide; palpal coxa 1.31 long, 0.72 wide. Legs elongate, femur I length 1.98 times carapace width; metatarsus I (fig. 71a, b) swollen and dorsoventrally flattened near base, with short retrolateral spur surmounted by stout clasping spine, distad of this segment constricted, stout spinules (fig. 8d) lining prolateral, dorsal, and retrolateral surfaces of constriction, with dorsal, spear-shaped, retromedian-directed process set in ring of desclerotized cuticle (fig. 8b, c), distad of this segment straight, unmodified; legs otherwise unmodified. Spination: palpus: femur d0-1-1; leg I: femur d0-1-0-1, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-0-0-1, v2-2-0-1, r1-0-0-1; leg II: femur d1-1-0-1, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-1-0-1, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-1, p0-1-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-0-1, v0-1-0-2, r0-1-0-1, metatarsus p1-0-1-2, v2-0-2-1, r1-0-1-2. Leg measurements:

	I	II	III	IV	Palp
Femur	6.00	5.00	4.38	5.44	1.50
Patella	1.84	1.50	1.25	1.56	0.63
Tibia	5.69	4.13	3.38	4.63	0.63
Metatarsus	5.94	4.56	3.56	5.50	—
Tarsus	2.31	1.88	1.63	1.75	1.19
Total	21.78	17.07	14.20	18.88	3.95

Palpal femur with triangular group of anterobasal thorns, distal 3 stoutest, all thorns shortened and thickened and set in enlarged sockets; tibia (fig. 70b) with dorsal D process long, slender, R rounded, weakly differentiated; palpal bulb (fig. 70a, c) with reservoir visible through tegulum as a tight loop, MA long, slender, apex extending past that of conductor, apex of conductor weakly twisted, pointed retrolaterally.

VARIATION: Total length 4.83–11.50; carapace length 1.31–1.47 times width, markings distinct to obscure, pars cephalica may have prefoveal v-shaped dark mark; thoracic fovea 0.12–0.19 length carapace, may be narrowed posteriorly; PER width 1.08–1.22 times AER, 2.42–3.31 times OAL; cheliceral length 4.67–6.67 times clypeal height, striae weak to strong, retromargin of fang furrow with 7 or 8 teeth; sternum length 1.11–1.18 times width, apex pointed to blunt; labium length 1.11–1.37 times width; femur I length 1.98–2.16 times carapace width, tibia I may have a stout, retrolateral subapical spine; legs uniformly marked, or III and IV with faint annuli; abdominal dorsum dark with light longitudinal band and transverse markings, or light with paired dark markings confluent posteriorly. Palpal tibia may have dorsal D process shorter than in type.

FEMALE (Town Bush): Total length 10.75. Markings as in male except darker, carapace shading to red-brown anteriorly, chelicerae, labium, and palpal coxa red-brown, sternum with dusky markings, abdomen gray-brown. Carapace 5.38 long, 3.72 wide; thoracic fovea long, deep, length 0.16 carapace; clypeus 0.53 high; ocular area 0.58 long, 1.62 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.14:1.14:1.14, diameter of PM 0.19; AM separated by 1⅛ their diameter, separated from AL by 1⅓ AM; PM separated by 1½ their diameter, separated from PL by 1⅘ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 2.72 long, robust, promargin of fang furrow with 6, retromargin with 6 large and 2 minute teeth. Sternum 2.59 long, 2.19 wide, as in male; labium 1.06 long, 0.88 wide; palpal coxa 1.78 long, 0.97 wide. Femur I length 1.68 times carapace width. Spination: palpus: femur d0-1-1, patella d0-0-1, tibia d0-0-1, p0-1-1-0, tarsus p3-3-1, v0-0-1-3-2, r1-1-0; leg I: femur d1-1-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-2-2, r0-1-1-0, metatarsus p1-0-0-1, v2-2-0-1, r1-0-0-1; leg II: femur d1-1-0-1, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-1-0-1, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-1, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-0-1-2. Palpal femur with triangular group of shortened setae and distal row of 2 anterobasal thorns. Calamistrum origin at

0.40 from metatarsus base, length 0.33 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	6.25	5.13	4.44	5.38	1.94
Patella	2.00	1.88	1.69	1.69	0.88
Tibia	5.81	4.19	3.25	4.56	1.13
Metatarsus	5.63	4.25	3.69	5.00	–
Tarsus	2.56	2.00	2.44	1.94	2.13
Total	22.25	17.45	15.51	18.57	6.08

Epigynum as in figure 72a, with copulatory openings hidden beneath recurved LTR, PML oval, strongly convex laterally, posterior margin rounded; spermathecae as in figure 72c, narrowed anteriorly, contiguous or little separated, distance between less than ⅛ length; anteromedian afferent chambers slender, posterolateral efferent chambers oval (fig. 11d).

VARIATION: Total length 6.56–11.88; carapace length 1.41–1.56 times width; thoracic fovea 0.13–0.18 length carapace, wide, narrowed posteriorly, or narrow for entire length; PER width 1.15–1.24 times AER, 2.50–2.81 times OAL; OQP 1.21–1.27 times OQA, 1.06–1.11 times OQL; cheliceral length 5.09–5.15 times clypeal height, smooth or with weak ventral wrinkles, promargin of fang furrow with 5 or 6, retromargin with 7 or 8 teeth; sternum length 1.17–1.19 times width, apex pointed or a right angle; labium length 1.14–1.29 times width; femur I length 1.63–1.81 times carapace width, leg markings uniform, or posterior legs with weak annuli. Abdominal dorsum uniform or with light longitudinal median band for entire length (fig. 68a) with posterior chevrons, ventral longitudinal light bands broken to entire (fig. 68b). Spermathecae contiguous or up to 0.27 times length apart; epigynum with PML oval to trapezoidal, posterior margin rounded to nearly straight.

NATURAL HISTORY: This species has been recorded from mist belt forest in the Natal Midlands, and in coastal evergreen forest along the Transkei coast. I have collected this species at the Town Bush Forest near Pietermaritzburg where they are the commonest cribellate spiders, occurring beneath rocks and logs (fig. 1b, d) and in small caves. The web is irregular or funnel shaped, with the spider at the apex of the funnel, and capture webs may form sheets which are several centimeters across. Mature individuals have been collected from the end of the dry season (August) well into the wet season (February).

DISTRIBUTION: Midelevations and coastal regions of southeastern part of South Africa (fig. 109).

MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Transkei coast, Lusikisiki Dist., Mzimhlava River mouth, coastal evergreen forest (M. Baddeley, MRAC), Dec. 1979, 1♂, Jan. 1980, 1♂, 3♀, Feb. 1980, 2♂, 5♀. *Natal*: Pietermaritzburg, Nov. 1917 (SAM), 1♀, 1951 (R. F. Lawrence, MRAC), 1♂, 1♀; Shooters Hill, Umgeni river, Pietermaritzburg, Dec. 1936, 2♂, Dec. 1937, 1♂ (*Haemilla silvicola* Lawrence, holotype), 1♀ (R. F. Lawrence, NMSA); Town Bush, Pietermaritzburg, elev. 2800–3200 ft, indigenous forest, Jan. 4, 1984 (C. E. Griswold & T. Meikle-Griswold, NMSA), 2♀, Jan. 4, 1986 (C. E. Griswold, NMSA), 2♀, Feb. 2, 1984, 1♀, Aug. 23, 1983, (C. E. Griswold & P. M. C. Croeser, NMSA), 1♂, Oct. 1, 1968 (B. Lamoral, NMSA), 2♂, 1♀, Oct. 19, 1985 (C. E. Griswold, J. T. Doyen, & P. M. C. Croeser, NMSA), 1♂, 2♀, Nov. 1954 (R. F. Lawrence, NMSA), 4♂, 1♀, Nov. 11, 1984 (C. E. Griswold & T. Meikle-Griswold, NMSA), 2♂ (molted), Nov. 18, 1984 (D. Herbert, NMSA), 1♀; Ashburton, Feb. 1972 (N. Dippenaar, NCP), 1♀; Dargle, Nov. 1942 (R. F. Lawrence, NMSA), 1♀; Mid-Illovo, Jan. 1966 (T. Schofield, NMSA), 1♀; Estcourt, Oct. 1937 (R. F. Lawrence, NMSA), 1♂.

Themacrys ukhahlamba, new species

Figures 72b, d, 109

TYPES: Holotype female, NMSA type no. 445, from an elevation of 10,000 ft at Mont aux Sources, Drakensberg Mts., Natal, South Africa (Mar. 1946; R. F. Lawrence), deposited in NMSA; 10 paratype females, same data, 1 each in AMNH and MRAC, remainder in NMSA.

ETYMOLOGY: The specific name is from the Zulu word meaning "barrier of spears," referring to the Drakensberg Mountains.

DIAGNOSIS: Epigynum (fig. 72b) with LTR transverse, with lateral, posteriad-directed triangular projections; spermathecae (fig. 72d)

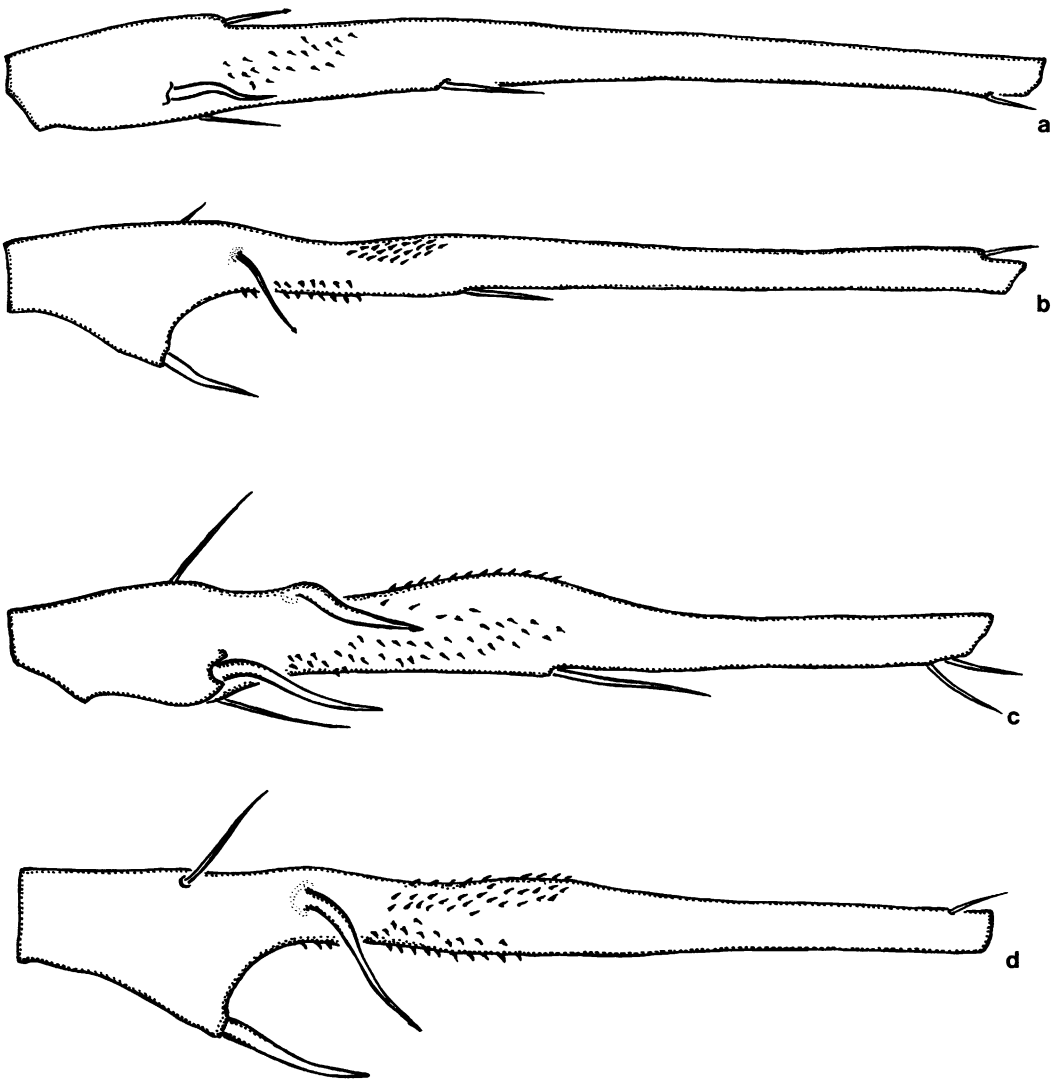

Fig. 71. *Themacrys* spp., right male metatarsi I. a, b. *silvicola* (Lawrence), Town Bush. c, d. *monticola* (Lawrence), lectotype. **a, c.** Retrolateral. **b, d.** Dorsal.

narrowed anteriorly, posterolateral efferent chambers larger than anterior afferent chambers.

NOTE: This species, known only from the female, is placed in *Themacrys* because of the form of the spermathecae and triangular group of anterobasal thorns on the palpal femur. This species shares with *T. silvicola* the synapomorphy of having the spermathecae narrowed anteriorly.

FEMALE (paratype): Total length 7.81. Carapace orange-brown, shading to red-brown anteriorly on pars cephalica, unmarked except for sclerotized radii on pars thoracica and along margin of pars cephalica; black pigment extending between AM and between lateral eyes; chelicerae red-brown, boss orange-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, unmarked, legs shading to orange-brown distally, palpal tarsus and metatarsus-tarsus I

red-brown; abdomen gray-brown, unmarked except for faint pair of longitudinal light brown bands on venter. Carapace 4.25 long, 2.81 wide; thoracic fovea long, narrow, deep, length 0.16 carapace; clypeus 0.35 high; ocular area 0.34 long, 1.17 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.19:1.13:1.38, diameter of PM 0.14; AM separated by ⅔ their diameter, separated from AL by 1⅛ AM; PM separated by 1⅓ their diameter, separated from PL by 1⅘ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.84 long, geniculate, smooth, promargin of fang furrow with 5 teeth, retromargin with 5 large teeth and 1 minute tooth. Sternum 2.28 long, 1.78 wide, narrowed anteriorly, margin entire, apex pointed; labium 0.77 long, 0.72 wide; palpal coxa 1.22 long, 0.73 wide. Legs relatively short, femur I length 1.15 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-1, tibia d0-0-1, p1-0-2, tarsus p2-2-1, v2-2-3-2, r1-0-0; leg I: femur d0-1-0-0, p0-0-1-1, tibia p0-0-1-0, v2-2-2, metatarsus p0-0-0-1, v2-2-1, r0-0-0-1; leg II: femur d1-1-0-0, p0-1-1-1, tibia p0-1-1-0, v2-2-2, metatarsus p0-1-0-2, v2-2-1, r0-1-0-1; leg III: femur d1-1-0-1, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia d0-0-1-0, p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-1, p0-0-0-1, r0-0-0-1, patella d1-0-0-0, tibia p0-1-1-0, v1-2-0-2, r0-1-1-0, metatarsus p1-1-1-2, v2-0-2-1, r1-0-1-2. Palpal femur with triangular group of 15–20 minute anterobasal thorns set in enlarged bases, 2 or 3 distal ones larger. Calamistrum origin at 0.39 from metatarsus base, length 0.35 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.81	2.88	2.63	3.56	1.25
Patella	1.25	1.03	1.00	1.13	0.50
Tibia	3.31	2.31	1.94	3.13	0.66
Metatarsus	3.19	2.25	2.19	3.00	—
Tarsus	1.50	1.19	1.06	1.19	1.25
Total	13.06	9.66	8.82	12.01	3.66

Epigynum (fig. 72b) with LTR transverse, with lateral, posteriad-directed triangular projections; PML oval, sides convex, posterior margin curved; spermathecae (fig. 72d) narrowed anteriorly, anterior afferent chambers slender, narrowed apically, posterolateral efferent chambers large, oval.

VARIATION: Total length 6.63–10.63; carapace length 1.35–1.52 times width; thoracic fovea 0.16–0.20 length carapace; PER width 2.93–3.48 times OAL; OQP 1.31–1.36 times OQA, 1.19–1.40 times OQL; cheliceral length 4.75–6.16 times clypeal height, promargin of fang furrow with 5 or 6, retromargin with 4 or 5 teeth; sternum length 1.24–1.28 times width, apex equal to or less than a right angle; labium length 1.00–1.07 times width; palpal femur with triangular group of anterobasal thorns, may be 1 or 2 conspicuously stouter than others.

MALE: Unknown.

DISTRIBUTION: Drakensberg Mountains, Natal, South Africa (fig. 109).

ADDITIONAL MATERIAL EXAMINED: SOUTH AFRICA: *Natal*: Little Switzerland Hotel, Drakensberg Mts., June 6, 1972 (E. S. Ross, CAS), 1♀.

Themacrys monticola (Lawrence)

Figures 71c, d, 73a–c, 74a, b, d, e, 109

Haemilla monticola Lawrence, 1939: 273 (male lectotype, type no. 293, and paralectotype, type no. 460, here designated, from the Drakensberg Mountains, South Africa, NMSA, examined). – Roewer, 1954: 1367. – Bonnet, 1957: 2071.

Themacrys monticola: Lehtinen, 1967: 270.

DIAGNOSIS: Male metatarsus I (fig. 71c, d) with dorsal, spear-shaped, retromedian-directed process set in ring of desclerotized cuticle; palpal tibia (fig. 73b) with D process broad, conical, retromedian margin differentiated into long, slender, median R2, and lateral, blunt R1; palpal bulb (fig. 73a, c) with MA short, triangular, not reaching conductor apex, apex of conductor with large, recurved, twisted process; epigynum (fig. 74a, b) with copulatory openings large, exposed, oval; leg formula 4123.

MALE (Ndumeni Forest): Total length 5.00. Carapace yellow-white, darkened to yellow-brown anteriorly on pars cephalica, black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown, boss yellow-white; labium and palpal coxa yellow-brown, lighter at tips; sternum, coxae, and trochanters, yellow-white, unmarked; legs and palpi yellow-white shading to yellow-brown distally; abdomen pale gray, unmarked. Carapace 2.53 long, 1.78 wide; thoracic fovea long, narrow, deep, nar-

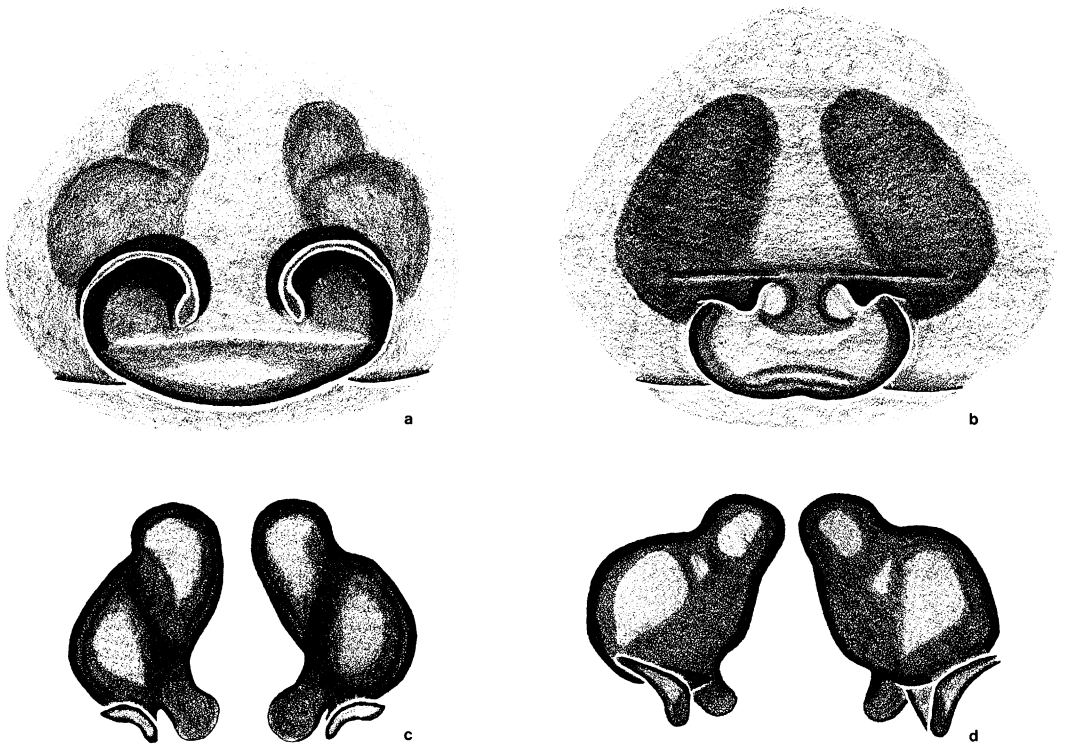

Fig. 72. *Themacrys* spp., female genitalia. a, c. *silvicola* (Lawrence), Town Bush. b, d. *ukhahlamba*, new species, paratype. **a, b.** Epigyna, ventral. **c, d.** Spermathecae, dorsal.

rowed posteriorly, length 0.15 carapace; clypeus 0.18 high; ocular area 0.25 long, 0.61 wide, PER slightly recurved; ratio of eyes AM:AL:PM:PL, 1.00:1.88:1.75:1.88, diameter of PM 0.10; AM separated by ⅔ their diameter, separated from AL by ⅘ AM; PM separated by nearly their diameter, separated from PL by 1⅛ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.01 long, slender, with weak lateral wrinkles, promargin of fang furrow with 6 teeth, retromargin with 4 or 5 large teeth and 1 minute tooth. Sternum 1.31 long, 1.13 wide, narrowed anteriorly, margin sinuate, apex a right angle; labium 0.42 long, 0.36 wide; palpal coxa 0.72 long, 0.38 wide. Legs relatively short, femur I length 1.74 times carapace width; metatarsus I swollen and dorsoventrally flattened near base, with short retrolateral spur surmounted by stout clasping spine, distad of this segment constricted, spinules lining prolateral, dorsal, and retrolateral surfaces of constriction, with dorsal, spear-shaped, retromedian-directed process set in ring of desclerotized cuticle, distad of this segment tapering; legs otherwise unmodified. Spination: palpus: femur d0-1-1, patella d0-0-1; leg I: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p0-0-0-1, v2-2-0-1, r1-0-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-0-0-2; leg III: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-0-0, p0-1-0-1, r0-0-0-1, tibia d1-0-0-1, p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-0-1-2, v2-2-0-1, r1-1-1-2. Leg measurements:

	I	II	III	IV	Palp
Femur	3.10	2.56	2.19	3.13	0.94
Patella	1.00	0.81	0.75	0.88	0.34
Tibia	2.94	2.12	2.36	2.88	0.41
Metatarsus	2.75	2.19	2.00	2.94	—
Tarsus	1.38	1.25	1.19	1.44	0.69
Total	11.17	8.93	8.49	11.27	2.38

Palpal femur with row of 4 small, slender,

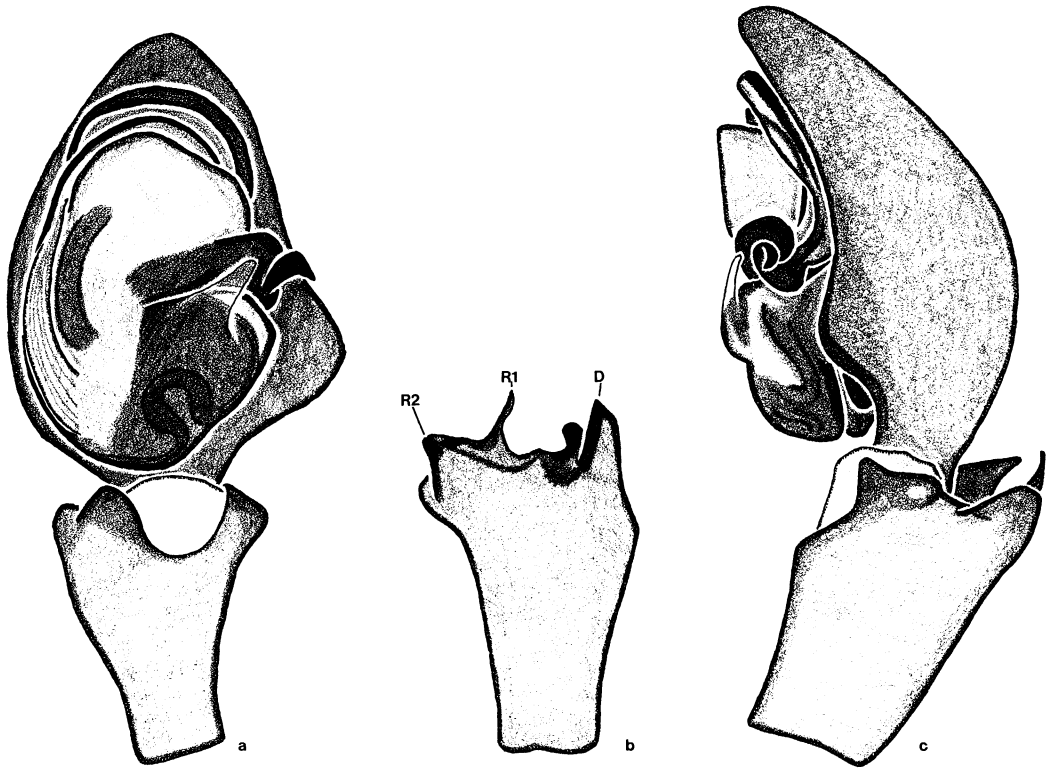

Fig. 73. *Themacrys monticola* (Lawrence) (paralectotype male of *Haemilla monticola* Lawrence), male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. D = dorsal process; R1 = inner, asetose sclerotized retrodorsal ridge; R2 = outer, setose retrodorsal lobe.

anterobasal thorns; tibia (fig. 73b) with D process broad, conical, retromedian margin differentiated into long, slender, median R2, and lateral, blunt R1; palpal bulb (fig. 73a, c) with reservoir visible through tegulum as a tight loop, MA short, triangular, not reaching conductor apex, apex of conductor with large, twisted recurved process.

VARIATION: Total length 4.94–7.63; carapace length 1.38–1.43 times width; thoracic fovea 0.11–0.19 length carapace, may be narrowed posteriorly; PER width 1.17–1.19 times AER, 2.43–2.77 times OAL; OQP 1.36–1.46 times OQA, 1.33–1.36 times OQL; cheliceral length 5.16–5.80 times clypeal height, promargin of fang furrow with 5 or 6, retromargin with 5–7 teeth; sternum length 1.15–1.28 times width, apex pointed to a right angle; labium length 1.04–1.24 times width; femur I length 1.60–1.79 times carapace width.

FEMALE (Ndumeni Forest): Total length 6.75. Markings as in male, except darker. Carapace 3.34 long, 2.34 wide; thoracic fovea deep, narrowed posteriorly, length 0.17 carapace; clypeus 0.27 high; ocular area 0.27 long, 0.88 wide, PER straight; ratio of eyes AM:AL:PM:PL, 1.00:1.17:1.17:1.33, diameter of PM 0.11; AM separated by ⅔ their diameter, separated from AL by 1⅙ AM; PM separated by 1¼ their diameter, separated from PL by 1¾ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.49 long, robust, promargin of fang furrow with 5, retromargin with 4 large and 2 minute teeth. Sternum 2.06 long, 1.41 wide, as in male, apex blunt; labium 0.63 long, 0.53 wide; palpal coxa 1.00 long, 0.53 wide. Femur I length 1.47 times carapace width. Spination: palpus: femur d0-0-1-1-1, patella d1-0-1, tibia d0-0-1, p0-1-1-0, tarsus p2-2-1, v2-1-2-3-2-1, r1-0-0; leg I: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v2-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-0-1, r0-1-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v2-

Fig. 74. Phyxelidinae spp., female genitalia. a, b, d, e. *Themacrys monticola* (Lawrence). a, d. Ndumeni Forest, Drakensberg Mountains. b, e. Swartkop, near Pietermaritzburg. c, f. Phyxelidini incertae sedis, Grootvadersbosch. **a-c.** Epigyna, ventral. **d-f.** Spermathecae, dorsal.

2-0-1, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia d1-0-1-0, p0-1-1-0, v1-2-0-1, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-1-0, p0-1-1-1, r0-0-0-1, tibia d1-0-1-0, p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-1-1-2, v2-0-2-1, r1-0-1-2. Palpal femur with anterobasal row of 4 slender thorns. Calamistrum origin at 0.48 from metatarsus base, length 0.29 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.44	2.75	2.50	3.50	1.25
Patella	1.25	1.06	0.94	1.09	0.44
Tibia	3.00	2.19	1.88	3.06	0.69
Metatarsus	2.75	2.25	2.13	3.13	—
Tarsus	1.38	1.25	1.19	1.38	1.31
Total	11.82	9.50	8.64	12.16	3.69

Epigynum (fig. 74a) with copulatory openings large, exposed, oval, LTR recurved; spermathecae (fig. 74d) broad anteriorly, anteromedian afferent ducts large and broad, posterolateral efferent ducts small and oval.

VARIATION: Total length 4.94–9.38; carapace length 1.43–1.54 times width; thoracic fovea 0.10–0.19 length carapace; PER width 1.13–1.32 times AER, 2.80–3.27 times OAL; OQP 1.11–1.52 times OQA, 1.15–1.58 times OQL; cheliceral length 5.07–6.18 times clypeal height, smooth or with weak lateral wrinkles, promargin of fang furrow with 5 or 6, retromargin with 6 or 7 teeth; sternum length 1.14–1.47 times width, apex blunt to pointed; labium length 1.00–1.18 times width; palpal femur with anterobasal rows of 3 or 4 short, slender setae in enlarged bases or with row of thorns; femur I length 1.40–1.58 times carapace width. Epigyna as in figure 74a, b, spermathecae as in figure 74d, e.

NATURAL HISTORY: These are the commonest cribellate spiders in the cool, wet *Podocarpus* forests at between 1000 and 2000 m in the gorges and canyons of the Drakensberg Mountains of Natal, where they are found beneath rocks and logs. They also occur in areas of moist montane grassland where there are abundant tree ferns along watercourses. This species also occurs in midelevation subtropical forests.

DISTRIBUTION: Drakensberg Mountains and Natal midlands of South Africa (fig. 109).

MATERIAL EXAMINED: SOUTH AFRICA: *Natal*: Estcourt, Oct. 1937 (R. F. Lawrence, NMSA), 1♂; Drakensberg Mts: Royal Natal National Park, Feb. 12, 1985 (molted), *Podocarpus* forest, elev. 5500 ft (C. E. Griswold, NMSA), 2♂; Cathkin Peak, Jan. 1938 (R. F.

Lawrence, NMSA), 2♂ (*Haemilla monticola* Lawrence, syntypes), Sept. 1943 (R. F. Lawrence, NMSA), 1♀; Cathedral Peak Forest Area, Apr. 1957, 1♀, Sept. 1943, 2♀ (R. F. Lawrence, NMSA); Ndumeni Forest, Cathedral Peak Forest Area, Feb. 21–24, 1984, *Podocarpus* forest, elev. 4800 ft (C. E. Griswold & T. Meikle-Griswold, NMSA), 3♂, 6♀; Ukhahlamba Research Station, Cathedral Peak Forest Area, elev. 5800–6100 ft, mixed *Themeda* grassland, Feb. 23–26, 1984 (C. E. Griswold & T. Meikle-Griswold, NMSA), 1♀, Nov. 28–31, 1983 (B. Londt, NMSA), 1♀; Injasuti Valley, Jan. 14, 1982, *Podocarpus* forest, elev. 5500 ft (P. Reavell, NMSA), 1♀; Champagne Castle Hotel, Jan. 1937 (R. F. Lawrence, NMSA), 1♀; Dlinza Forest, Eshowe District, Oct. 1960 (N. Leleup, MRAC), 1♂; Swartkops, Pietermaritzburg, Aug. 1957 (R. F Lawrence, NMSA), 3♀.

Themacrys cavernicola (Lawrence)
Figures 75a–c, 76b, d, 78c, d, 108

Haemilla cavernicola Lawrence, 1939: 274 (male lectotype, type no. 294, and paralectotype female, type no. 458, here designated, from the Noodsberg Caves, South Africa, NMSA, examined). – Roewer, 1954: 1367.
Themacrys cavernicola: Lehtinen, 1967: 270.
Haemilla silvicola: Lawrence, 1939: 272 (misidentification, not *silvicola* Lawrence, 1938).

DIAGNOSIS: Male metatarsus I (fig. 78c, d) with short subbasal spur surmounted by stout clasping spine, distad of spur prolateral and retrolateral groups of a few stout spinules and short dorsal carina surmounted by row of 3 or 4 stout spinules, tibia I unmodified; palpal tibia (fig. 75b) with D process very short, acute, recurved, retrolateral margin differentiated into ridgelike R1 and conical R2; palpal bulb (fig. 75a, c) with reservoir visible through tegulum as tight loop, MA short, slender; spermathecae (fig. 76d) separated by more than ½ their length; legs elongate, femur I length greater than 2¼ times carapace width. There appear to be no characters which consistently separate females of *T. cavernicola* from females of *T. irrorata*.

MALE (Kranskop): Total length 7.69. Carapace yellow-brown, pars thoracica dusky along margin, with diffuse anteromedian, median, and posteromedian dusky radii, with broad, dusky, v-shaped mark anteriad of thoracic fovea prolonged into longitudinal line on each side extending anteriorly along margin of pars cephalica; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown, labium and palpal coxa yellow-brown; sternum yellow-brown, darkened along margin, coxae and trochanters yellow-brown, sternum and coxae dusky; legs and palpi yellow-white, shading to yellow-brown distally, unmarked, tibia-metatarsus I orange-brown; abdomen dark gray-brown, dorsum with median longitudinal light band and 6 or 7 light crossbands, venter with pair of broad longitudinal light bands, between these several pairs of light spots. Carapace 4.06 long, 3.00 wide; thoracic fovea deep, wide, length 0.17 carapace; clypeus 0.34 high; ocular area 0.45 long, 1.07 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.38:1.25:1.38, diameter of PM 0.16; AM separated by their diameter, separated from AL by ¾ AM diameter; PM separated by their diameter, separated from PL by 1¼ PM diameter; lateral eyes separated by ¼ PL diameter. Chelicerae 1.48 long, with weak ventral and lateral wrinkles, promargin of fang furrow with 5, retromargin with 4 large and 2 minute teeth. Sternum 2.13 long, 1.75 wide, narrowed anteriorly, margin nearly entire, apex pointed, blunt; labium 1.19 long, 0.75 wide; palpal coxa 1.79 long, 0.75 wide. Legs very elongate, femur I length 2.60 times carapace width; tibia I unmodified; metatarsus I (fig. 78c, d) with short subbasal spur surmounted by stout clasping spine, distad of spur prolateral and retrolateral groups of a few stout spinules and short dorsal carina surmounted by row of 4 stout spinules, distad to this segment slender, straight. Spination: palpus: femur d0-1-1; leg I: femur p0-1-1-1, r0-1-1-1, tibia p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-0-0-1, v2-2-0-1, r1-0-01; leg II: femur d1-1-0-0, p0-1-1-1, r0-1-1-1, tibia p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-1-1-1, tibia d1-0-1-0, p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-1-1, p0-1-1-1, r0-0-1-1, tibia p0-1-1-0, v1-0-1-0, r0-1-1-0, metatarsus p1-1-1-2, v2-0-2-1, r1-0-1-1. Leg measurements:

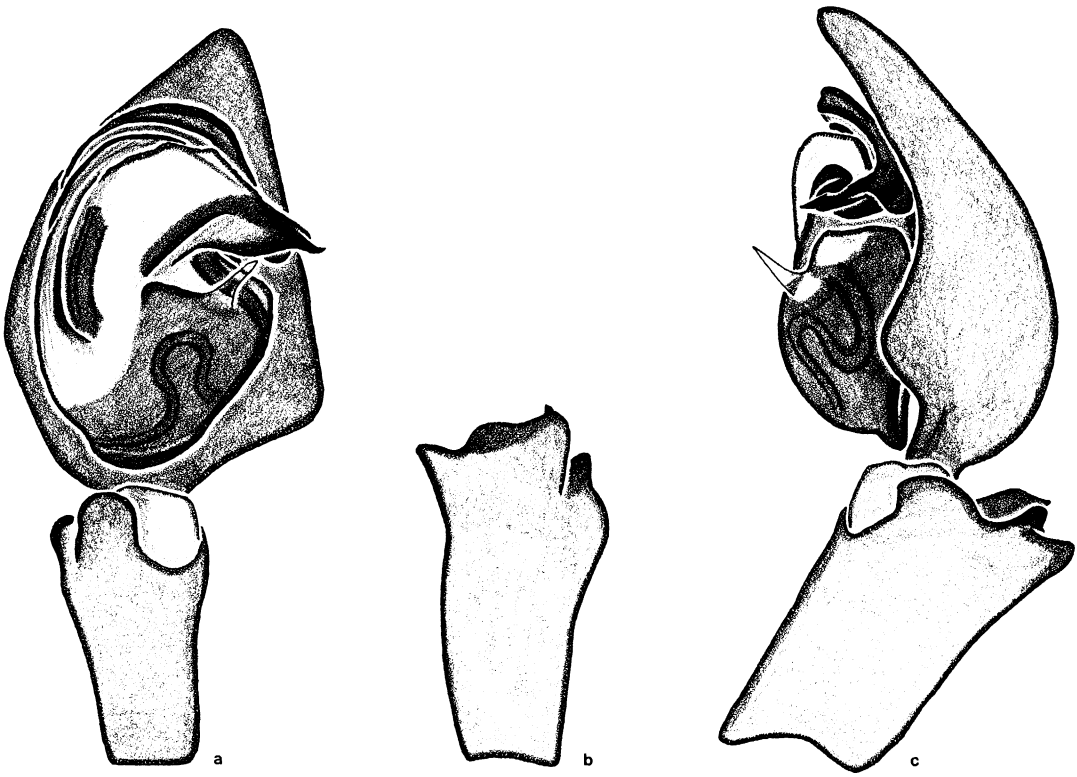

Fig. 75. *Themacrys cavernicola* (Lawrence) (lectotype of *Haemilla cavernicola* Lawrence), male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

	I	II	III	IV	Palp
Femur	7.81	6.00	5.19	6.56	1.38
Patella	1.81	1.50	1.31	1.50	0.50
Tibia	7.50	5.19	4.25	6.00	0.69
Metatarsus	7.50	5.19	4.75	6.94	—
Tarsus	2.88	2.31	2.00	2.44	1.06
Total	27.50	20.19	17.50	23.44	3.63

Palpal femur with anterobasal row of 4 small thorns set in enlarged bases; tibia (fig. 75b) with D process very short, acute, recurved, retrolateral margin differentiated into ridge-like R1 and conical R2; palpal bulb as in figure 75a, c, reservoir visible through tegulum as a tight loop, MA short, slender; apex of conductor with sharp apical point and subapical, proximal semicircular flange.

VARIATION: Total length 7.69–11.13; carapace markings distinct to obscure, prefoveal v-shaped mark present or absent; thoracic fovea 0.17–0.20 length carapace; PER width 1.13–1.16 times AER, 2.39–2.79 times OAL; OQP 1.06–1.25 times OQA, 1.11–1.31 times OQL; sternum length 1.21–1.27 times width; labium length 1.38–1.58 times width; femur I length 2.60–2.92 times carapace width.

FEMALE (Noodsberg Cave): Total length 13.88. Carapace orange-brown, pars thoracica dusky along margin and with anteromedian, median, and posteromedian sclerotized radii, pars cephalica darkened along margin and shading to dark red-brown anteriorly; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown, boss orange-brown; labium and palpal coxa red-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi orange-brown, palpal tarsus, apex of palpal metatarsus, tibia-tarsus I and metatarsus-tarsus II red-brown; abdomen gray-brown, dorsum with anteromedian light cardiac mark, venter with pair of bold longitudinal light bands, area between these with several pairs of light spots. Carapace 6.56 long, 4.53 wide, margin weakly sinuate; tho-

racic fovea wide, deep, length 0.18 carapace; clypeus 0.69 high; ocular area 0.61 long, 1.86 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.25:1.08:1.29, diameter of PM 0.21; AM separated by nearly their diameter, separated from AL by 1⅓ AM diameter; PM separated by 1½ their diameter, separated from PL by 1⅘ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 2.80 long, robust, venter with broad, shallow wrinkles, promargin of fang furrow with 6, retromargin with 6 large and 2 minute teeth. Sternum 3.31 long, 2.56 wide, apex a right angle; labium 1.31 long, 1.03 wide; palpal coxa 2.13 long, 1.09 wide. Femur I length 2.29 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-1, p1-1, tibia d0-0-2, p2-0-1-0, tarsus p3-2-1, v2-1-1-2-3-3-3-1, r2-1-0; leg I: femur d1-1-0-0-0, p0-0-1-1-1, r0-1-0-1-1, tibia p0-1-1-0, v2-0-2-0-2, r0-1-1-0, metatarsus p1-0-0-01, v2-2-0-0-1, r1-0-0-01; leg II: femur d1-0-1-0-1, p0-0-1-1-1, r0-1-1-1-1, tibia p0-1-1-0, v2-0-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-0-1, r1-1-0-2; leg III: femur d1-1-0-0-1, p0-0-1-1-1, r0-0-1-1-1, patella d0-0-1, tibia d1-0-0-1, p0-1-1-0, v2-0-2-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-0-1, r1-1-0-2; leg IV: femur d1-1-0-0-1, p0-0-1-1-1, r0-0-0-1-1, patella d0-0-1, tibia p0-1-1-0, v2-0-2-0-2, r0-1-1-0, metatarsus p1-0-1-1-2, v1-1-1-1-1, r1-0-0-1-2. Palpal femur with proximal group of anterobasal setae in enlarged bases and row of 2 small thorns. Calamistrum origin at 0.54 from metatarsus base, length 0.20 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	10.38	8.19	6.81	8.75	2.50
Patella	2.50	2.19	2.00	2.31	1.00
Tibia	9.88	6.81	5.44	7.75	1.44
Metatarsus	9.50	7.00	6.19	8.50	—
Tarsus	3.56	3.00	2.56	2.94	2.69
Total	35.82	27.19	23.00	30.25	7.63

Epigynum as in figure 76b, broadly rectangular, sides weakly convex, copulatory openings hidden beneath weakly recurved LTR; spermathecae (fig. 76d) broad anteriorly, separated by more than ½ their length, anterior afferent chambers nearly spherical, posterolateral efferent chambers long, narrow.

VARIATION: Total length 10.63–13.88; carapace length 1.34–1.53 times width, markings distinct to obscure, prefoveal v-shaped mark faint to absent; PER width 1.14–1.16 times AER, 2.53–3.05 times OAL; OQP 1.24–1.32 times OQA, 1.06–1.22 times OQL; cheliceral length 4.00–4.17 times clypeal height, retromargin of fang furrow with 6 or 7 teeth; sternum length 1.28–1.32 times width, apex pointed to blunt; labium length 1.27–1.46 times width; femur I length 2.29–2.97 times carapace width; palpal femur with 2–5 short, slender thorns in enlarged bases at apex of triangular anterobasal group of setae. Distance between spermathecae 0.50–0.90 times length; PML oval to trapezoidal, posterior margin straight to convex.

NATURAL HISTORY: This appears to be a rare species. The type specimens were taken in caves, and the species may be an obligate troglobite. Records from the vicinity of Pietermaritzburg do not specify if the specimens were taken in caves.

DISTRIBUTION: Natal midlands of South Africa (fig. 108).

MATERIAL EXAMINED: SOUTH AFRICA: *Natal*: Noodsberg Caves, May 1937 (R. F. Lawrence, NMSA), 1♂, 1♀ (*Haemilla cavernicola* Lawrence, syntypes), May 1951 (R. F. Lawrence, NMSA), 1♂, 1♀; Shooters Hill, Pietermaritzburg (R. F. Lawrence, NMSA), 1♀; Kranskop, Nov. 1940 (G. Rump, NMSA), 1♂; Lilane, near Kranskop, May 1962 (R. F. Lawrence, NMSA), 1♂.

Themacrys irrorata Simon

Figures 76a, c, 77a–c, 78a, b, 108

Themacrys irrorata Simon, 1906: 288 (female and male syntypes from Natal, South Africa, MNHN, not examined). – Bonnet, 1959: 4421. – Lehtinen, 1967: 269.

Themarcys (lapsus) *irrorata*: Roewer, 1954: 1379.

Haemilla australis Lawrence, 1937: 217 (male lectotype, NMSA type no. 21, and 1 male and 1 female paralectotypes, NMSA type nos. 461 and 462, here designated, from Hluhluwe Game Reserve, South Africa, NMSA, examined). – Roewer, 1954: 1367. – Bonnet, 1957: 2071. – First synonymized by Lehtinen, 1967: 270.

NOTE: The type series of *Themacrys* irrorata Simon was not available for study as it was lent to Lehtinen in the 1960s and has never been returned. Of the 6 males and 4 females mentioned by Lawrence in his original description of *Haemilla australis* (Lawrence, 1937: 217) I have been able to locate

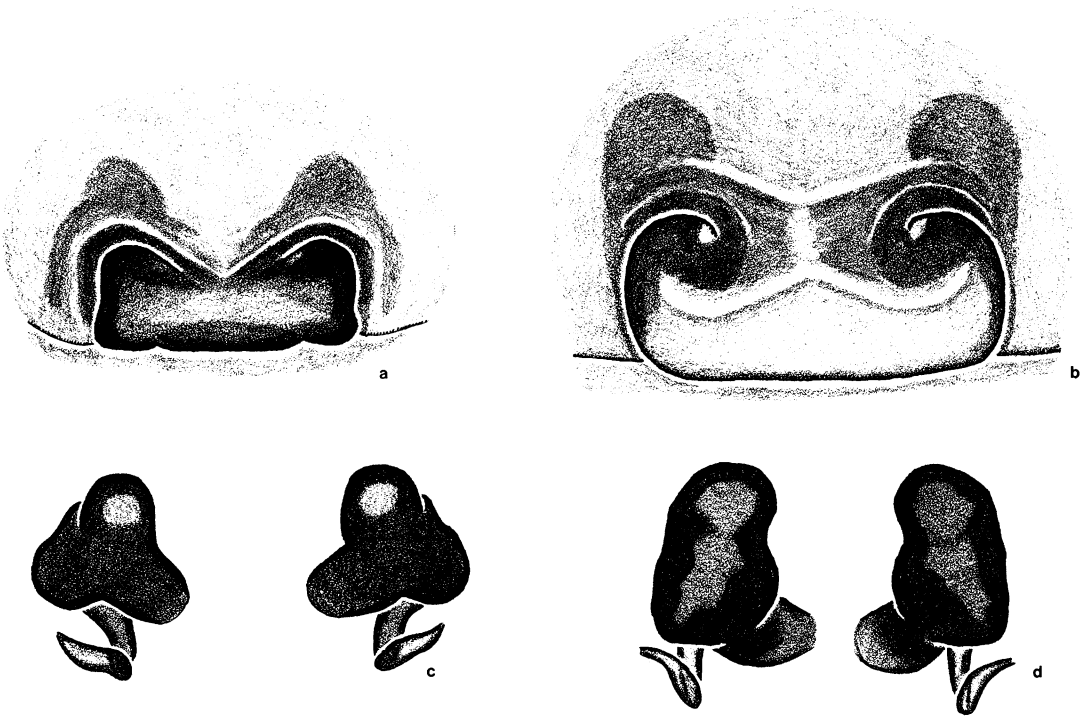

Fig. 76. *Themacrys* spp., female genitalia. a, c. *irrorata* Simon. a. Umhlali. c. (paralectotype of *Haemilla australis* Lawrence). b, d. *cavernicola* (Lawrence). b. Shooters Hill. d. Noodsberg caves. **a, b.** Epigyna, ventral. **c, d.** Spermathecae, dorsal.

only 1 complete male and female, 1 male lacking the abdomen, and 1 fragmentary female at the Natal Museum. Accordingly, the intact male and female and partial male are designated as lectotype and paralectotypes.

DIAGNOSIS: Male tibia I (fig. 78a, b) with short subapical retrolateral spur surmounted by spine; metatarsus I (fig. 78a, b) with large, subbasal retrolateral spur surmounted by stout clasping spine, with dorsal carina surmounted by row of 10 stout spinules; palpal tibia (fig. 77b) with D process recurved, retrolateral margin weakly differentiated into ridgelike R1 and acute R2; palpal bulb as in figure 77a, c, reservoir visible through tegulum as a gentle meander, apex of conductor sharply pointed; epigynum (fig. 76a) with copulatory openings hidden beneath recurved LTR; spermathecae (fig. 76c) widely separated, distance between greater than ½ length. There appear to be no characters which consistently separate females of *T. irrorata* from females of *T. cavernicola.*

MALE (holotype of *Haemilla australis* Lawrence): Total length 13.13. Carapace yellow-brown, orange-brown along margin of pars cephalica, margin of pars thoracica dusky; pars cephalica with narrow, dusky, U-shaped mark anteriad of thoracic fovea narrowed to longitudinal line on each side and extending anteriorly halfway to eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae dark red-brown, boss orange-brown; labium and palpal coxa orange-brown, lighter at tips; sternum yellow-brown, orange-brown along margin; coxae and trochanters yellow-brown; legs and palpi yellow-white, unmarked, apices of femora and patellae shading to yellow-brown, and tibia-tarsus I red-brown; abdomen gray-brown, dorsum with anterior longitudinal light cardiac mark with 3 transverse light bars, posteriorly 2 or 3 hairline chevrons, venter with pair of broad, broken longitudinal light bands, area between these brown with several pairs of light spots in longitudinal row. Carapace 6.31 long, 4.75 wide, margin weakly sinuate; thoracic fovea long,

deep, narrowed posteriorly, length 0.25 carapace; clypeus 0.54 high; ocular area 0.51 long, 1.49 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.36:1.27:1.36, diameter of PM 0.22; AM separated by ¾ their diameter, separated from AL by $^9/_{10}$ AM; PM separated by nearly their diameter, separated from PL by 1½ PM diameter; lateral eyes separated by ¼ PL diameter. Chelicerae 2.43 long, finely wrinkled on anterior and lateral surfaces, with strong lateral striae and narrow ventral row of widely spaced, shallow striae; promargin of fang furrow with 5 or 6, retromargin with 5 large and 2 minute teeth. Sternum 3.44 long, 2.53 wide, strongly narrowed anteriorly, margin sinuate, apex prolonged, blunt; labium 1.22 long, 0.88 wide; palpal coxa 1.81 long, 0.88 wide. Legs elongate, femur I length 2.37 times carapace width; tibia I (fig. 78a, b) with short subapical retrolateral spur surmounted by spine, metatarsus I (fig. 78a, b) with large, subbasal retrolateral spur surmounted by stout clasping spine, distad of spur segment narrowed and concave retrolaterally, with dorsal carina surmounted by row of 10 stout spinules extending for ¼ metatarsus length and prolateral field of fine spinules extending for ⅓ length, distad of these segment tapering. Spination: palpus: femur d0-0-1-1; leg I: femur d0-1-0-0-1, p0-1-0-1-1, r0-1-1-1-1, tibia p0-1-1-0, v2-0-2-2, r0, metatarsus p1-0-0-1, v2-0-2-0-2, r1-0-01; leg II (absent); leg III: femur d1-1-0-1, p0-1-1-1, r0-1-1-1, patella d0-0-1, tibia d1-0-1-0, p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0-1, p0-1-1-0-1, r0-0-0-1-1, tibia p0-1-1-0, v2-0-0-1-2, r0-1-1-0, metatarsus p1-1-1-2, v2-0-1-1-1, r1-0-0-1-2. Leg measurements:

	I	II	III	IV	Palp
Femur	11.25	—	7.50	9.38	2.44
Patella	2.88	—	2.06	2.38	0.81
Tibia	9.06	—	5.81	8.63	1.06
Metatarsus	8.69	—	6.75	10.00	—
Tarsus	4.63	—	2.75	3.13	1.69
Total	36.51	—	24.87	33.52	6.00

Palpal femur with triangular group of several slender anterobasal thorns in enlarged bases, apical 2 stoutest; tibia (fig. 77b) with D process conical, recurved, retrolateral margin weakly differentiated into ridgelike R1 and acutely conical R2; palpal bulb as in figure 77a, c, reservoir visible through tegulum as a gentle meander, MA long, slender, triangular, apex of conductor sharply pointed.

VARIATION: Total length 12.88–13.13; carapace length 1.33–1.52 times width; thoracic fovea 0.15–0.25 length carapace; PER width 1.14–1.21 times AER, 2.44–2.91 times OAL; OQP 1.32–1.35 times OQA, 1.00–1.16 times OQL; cheliceral length 4.03–4.47 times clypeal height, lateral striae may be strong, retromargin of fang furrow with 6 or 7 teeth; femur I length 2.37–2.77 times carapace width.

FEMALE (Ngotsche Forest): Total length 13.00. Carapace orange-brown, pars thoracica dusky along margin and with short anteromedian, median, and posteromedian radii; pars cephalica shading to red-brown anteriorly, with dusky, U-shaped mark anteriad of thoracic fovea, broad at base and narrowed to line halfway to ocular area; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown, boss orange-brown; labium and palpal coxa red-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, unmarked except sternum and coxae with faint dusky markings, palpal tarsus, apical half of tibia I and metatarsi-tarsi I and II orange-brown; abdomen gray, dorsum with median longitudinal light band with connected anterior paired light spots and posterior chevrons, sides mottled with oblique dark and light markings, venter with pair of broad longitudinal light bands, between these a few anterior and posterior light spots. Carapace 5.59 long, 3.78 wide, margin entire; thoracic fovea long, deep, fairly wide, length 0.20 carapace; clypeus 0.59 high; ocular area 0.56 long, 1.60 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.24:1.19:1.33, diameter of PM 0.20; AM separated by $^4/_5$ their diameter, separated from AL by 1½ AM; PM separated by 1¼ their diameter, separated from PL by 1¾ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 2.46 long, robust, smooth, promargin of fang furrow with 6, retromargin with 5 large and 2 minute teeth. Sternum 2.81 long, 2.13 wide, narrowed anteriorly, margin weakly sinuate, apex a right angle; labium 1.16 long, 0.94 wide; palpal coxa 1.81 long, 0.91 wide. Legs elongate, femur I length 2.41 times carapace width. Spination: palpus: femur d0-0-1-1, patella d0-0-1, tibia d0-0-1, p0-1-0-1, tarsus p3-2-1, v2-1-2-3-2-1, r1-0-1; leg I: femur d0-1-0-0-1,

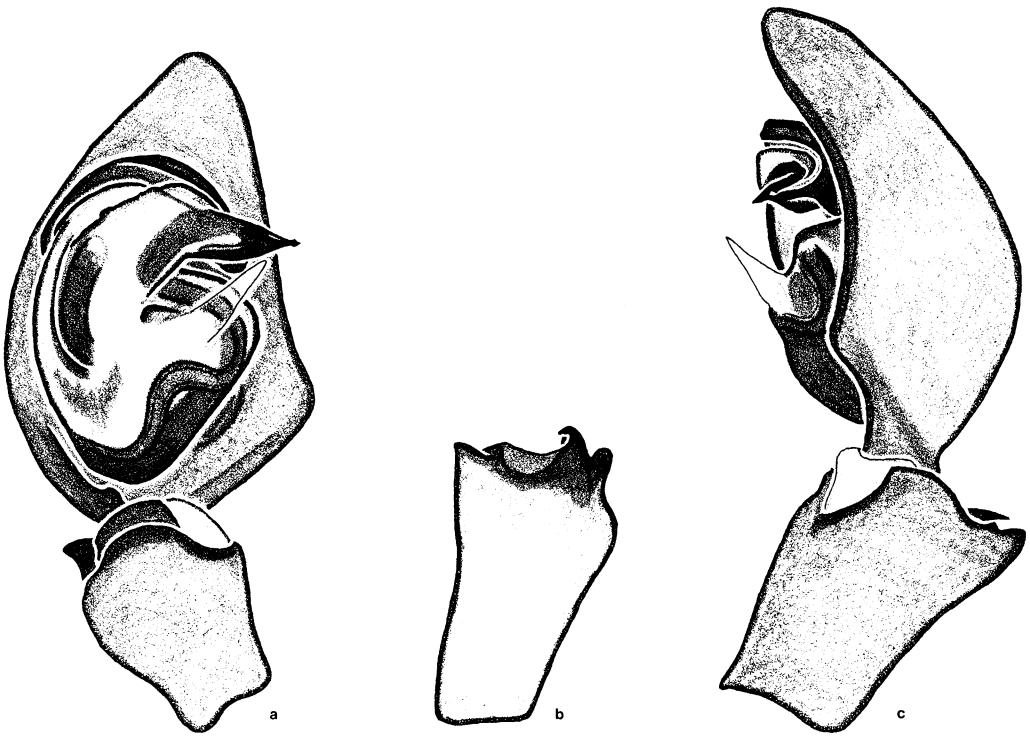

Fig. 77. *Themacrys irrorata* Simon (lectotype of *Haemilla australis* Lawrence), male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

p0-0-1-1-0, r0-1-1-1-1, tibia p0-1-1-0, v2-0-2-0-2, r0-1-1-0, metatarsus p1-0-0-0-1, v1-2-0-1, r1-0-0-0-1; leg II: femur d1-1-0-0-0, p0-0-1-1-1, r0-1-1-1-1, tibia p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d0-1-0-1, p0-1-1-1, r0-1-1-1, patella d0-0-1, tibia d0-0-1-0, p0-1-1-0, v1-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-1, r1-1-0-2; leg IV: femur d2-1-0-1-1-1, p0-0-0-0-0-1, r0-0-0-0-1-1, tibia d0-0-1-0, p0-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-1-2, v1-1-1-1-1-1, r1-0-1-1. Palpal femur with basal group of setae in enlarged bases and row of 3 anterobasal thorns, distal stoutest. Calamistrum origin at 0.52 from metatarsus base, length 0.21 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	9.13	6.69	5.75	7.63	2.13
Patella	2.31	1.81	1.00	1.81	0.81
Tibia	8.50	5.63	4.93	6.50	1.13
Metatarsus	8.25	6.06	5.31	7.13	—
Tarsus	3.25	2.56	2.25	2.50	2.19
Total	31.44	22.75	19.24	25.57	6.26

Epigynum (fig. 76a) with PML rectangular, sides parallel, posterior margin straight, copulatory openings hidden beneath recurved LTR, with medially recurved transverse ridge anteriad of LTR; spermathecae broad anteriorly, widely separated, distance between greater than 1.20 length; with small, anterior afferent chambers and posterolateral, tubular efferent chambers.

VARIATION: Total length 9.63–15.88; carapace length 1.33–1.48 times width; thoracic fovea 0.18–0.23 length carapace, wide to narrowed posteriorly; PER width 1.16–1.24 times AER, 2.86–3.25 times OAL; OQP 1.19–1.37 times OQA, 1.05–1.38 times OQL; cheliceral length 3.48–4.16 times clypeal height, smooth or with weak to broad ventral wrinkles, promargin of fang furrow with 5 or 6, retromargin with 7 or 8 teeth; sternum length 1.25–1.41 times width, apex pointed or a right angle; labium length 1.22–1.35 times width; femur I length 1.91–2.41 times carapace width; palpal femur with triangular group of anterobasal thorns, with 2–5 much stouter apical thorns. Distance between spermathecae 0.59–1.20 times length, spermathecal

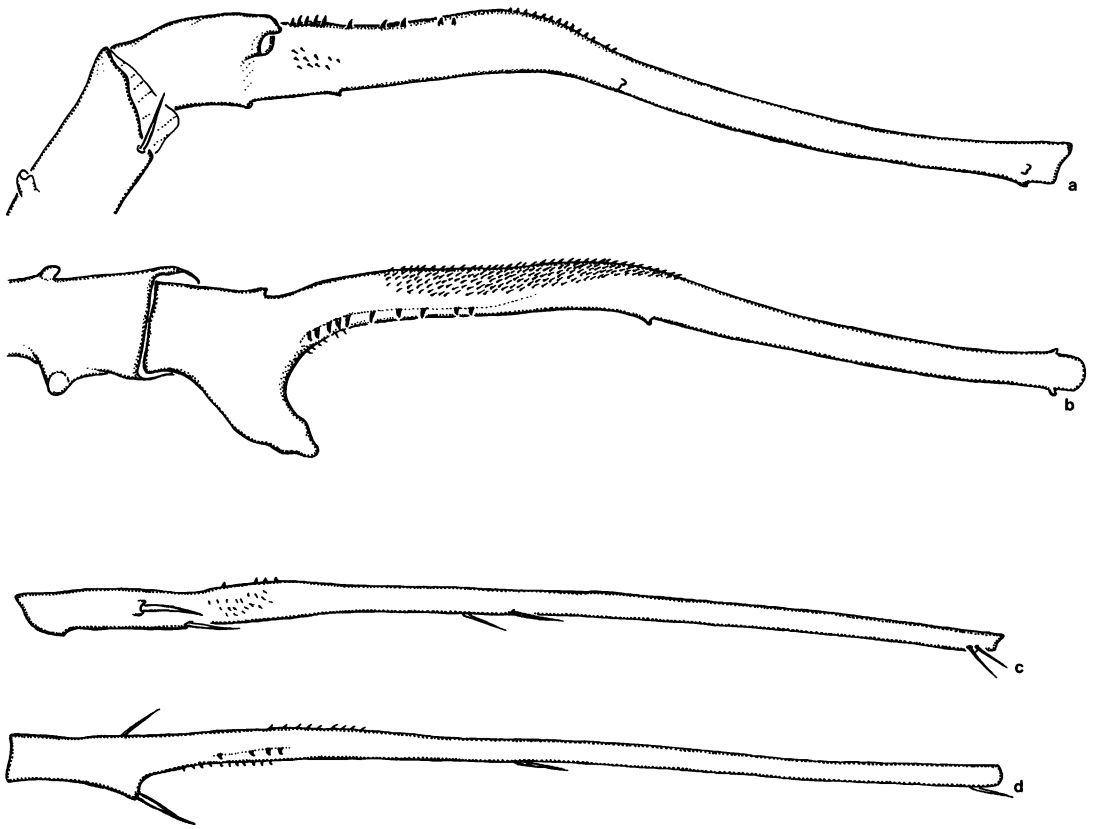

Fig. 78. *Themacrys* spp., right male leg I. a, b. Apex of tibia and metatarsus of *irrorata* Simon (lectotype of *Haemilla australis* Lawrence, note clasping spine is lost). c, d. Metatarsus of *cavernicola* (Lawrence), lectotype. **a, c.** Retrolateral. **b, d.** Dorsal.

capsules horizontal or obliquely vertical (Hluhluwe: fig. 76c); epigynum with PML oval to trapezoidal, posterior margin straight to convex.

NATURAL HISTORY: This species is common in midelevation and coastal forests and occurs also in dense, moist bushveld (such as the Hluhluwe Reserve) where it is found in riparian situations. I have collected individuals in Zululand beneath rocks and logs and beneath the bark of standing trees.

DISTRIBUTION: Zululand and coastal regions of Natal and Transkei, South Africa (fig. 108).

MATERIAL EXAMINED: SOUTH AFRICA: *Cape Province*: Transkei coast, Lusikisiki Dist., Mzimhlava River mouth, Jan. 1980, coastal evergreen forest (M. Baddeley, MRAC), 1♀. *Natal*: Durban, Dec. 7, 1903 (F. J. Quekett, BMNH), 1♀; Umhlali, Oct. 1935 (R. F. Lawrence, NMSA), 5♀, Oct. 1938 (R. F. Lawrence, NMSA), 3♀; Krantzkop, Nov. 1917 (SAM), 1♀; Hluhluwe Nature Reserve, Zululand, Oct. 1935 (R. F. Lawrence, NMSA), 2♂, 1♀ (*Haemilla australis* Lawrence, syntypes), 3♀; eastern Zululand, Jan. 1903 (E. Warren, NMSA), 1♀; Enseleni Nature Reserve, Sept. 13, 1984, in web at base of *Ficus sycamorus* in flood forest zone (P. Reavell, NMSA), 1♀; Mtunzini, Twin Streams Farm, Jan. 20, 1984, coastal dune forest (C. E. Griswold, T. Meikle-Griswold, & P. M. C. Croeser, NMSA), 1♀; Dlinza Forest, Eshowe, Jan. 17, 1984, elev. 1800 ft, indigenous forest (C. E. Griswold, NMSA), 3♀; Ngotsche Forest, 10 km W Eshowe, Jan. 18, 1984, elev. 1800 ft, indigenous forest (C. E. Griswold & T. Meikle-Griswold, NMSA), 2♀.

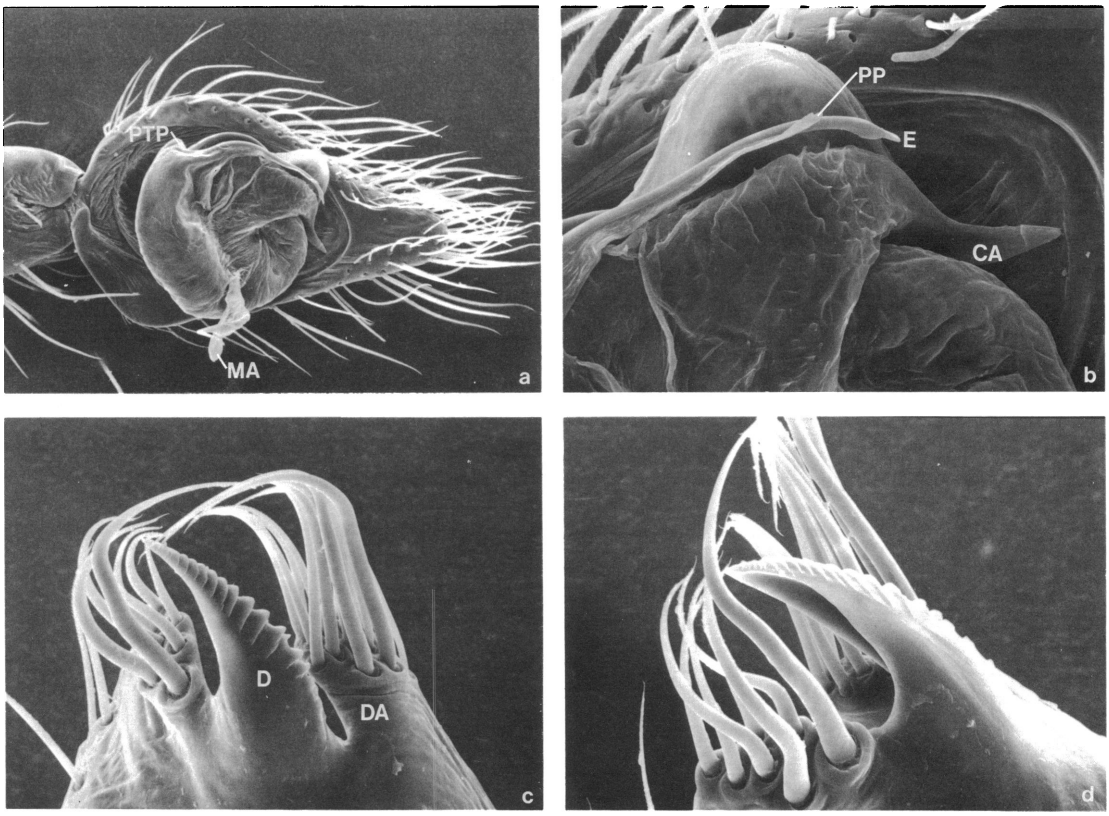

Fig. 79. *Phyxelida* spp., male palpus. a, b. *kipia*, new species, Uzungwa Mts. c, d. *sindanoa*, new species, holotype. **a.** Palpus, ventral. **b.** Apex of palpal bulb. **c.** Apex of palpal tibia, dorsal. **d.** Apex of palpal tibia, retrodorsal, showing infolded edges of dorsal process. D = dorsal tibial process; DA = anterodorsal tibial lobe; PTP = prolateral tegular protuberance; MA = median apophysis; E = embolus; PP = lamellate pars pendula; CA = conductor apex.

PHYXELIDA SIMON

Phyxelida Simon, 1894b: 64 (type species by monotypy *Phyxelida makapanensis* Simon, male and female syntypes in MNHN, examined). – Roewer, 1954: 1370. – Bonnet, 1958: 3652. – Brignoli, 1983: 528.

Haemilla Simon, 1909: 29 (type species by monotypy *Tegenaria mirabilis* L. Koch, male holotype in BMNH, examined). – Roewer, 1954: 1367. – Bonnet, 1957: 2071. – First synonymized by Lehtinen, 1967: 237.

Amphigyrum Tullgren, 1910: 93 (type species by monotypy *Amphigyrum nebulosum* Tullgren, female syntypes in NRS, examined). – Bonnet, 1955: 300. – Synonymized with *Haemilla* by Berland, 1914: 58. – First synonymized with *Phyxelida* by Lehtinen, 1967: 213.

Amphigyriodes Strand, 1913: 327 (type species by monotypy *Amphigyriodes bifoveata* Strand, female holotype in ZMB, examined). – Roewer, 1954: 1360. – Bonnet, 1955: 299. – First synonymized by Lehtinen, 1967: 213.

DIAGNOSIS: Male palpus with paired dorsal tibial processes (fig. 79c); median apophysis (MA) thickened, clavate, or cylindrical (figs. 79a, 82a, 88a); thoracic fovea (fig. 80a, c) usually broad, deep, length 1.47–4.50 (rarely to 6.00) times width; sternum (fig. 80b) usually broad anteriorly, greatest width 1.28–1.46 (rarely to 1.70) times width at anterior margin.

DESCRIPTION: Small to large spiders (fig. 80a–c), total length 3 to 13 mm. Carapace length 1.23–1.42 times width; thoracic fovea length 0.11–0.25 length of carapace, usually broad and deep, length 1.47–6.00 times width, but may be narrowed posteriorly, or rectangular; clypeal height 1.65–3.40 times AM di-

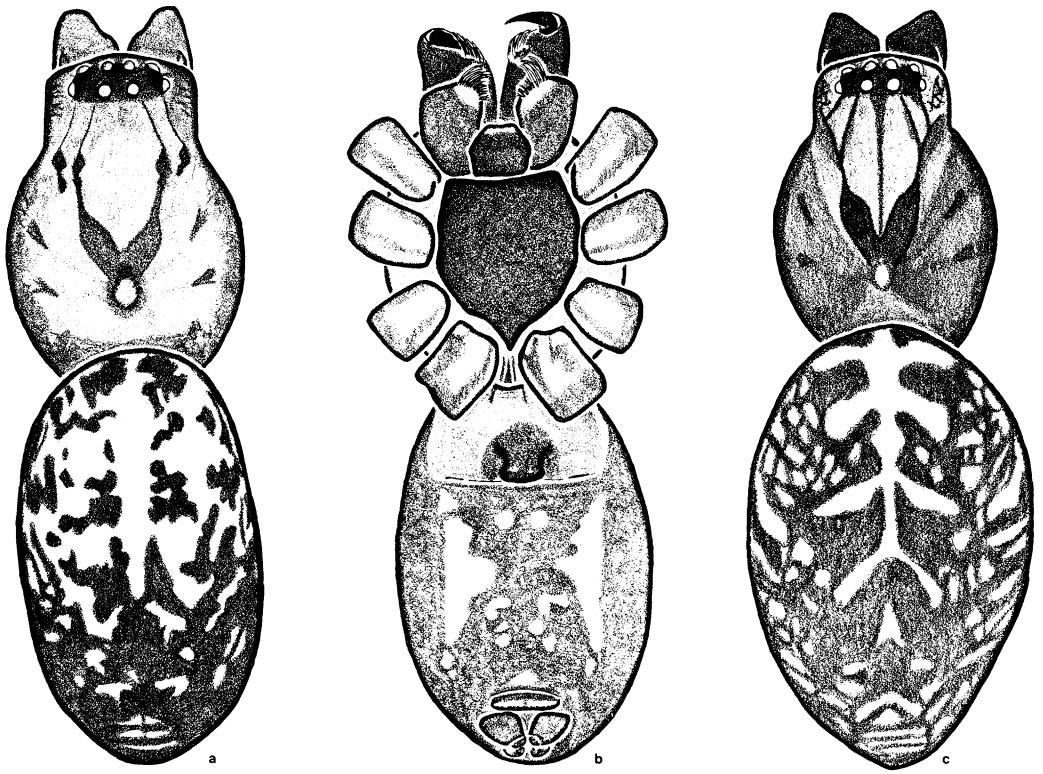

Fig. 80. Bodies of female *Phyxelida*. a, b. *sindanoa*, new species, Mt. Elgon. c. *malagasyana*, new species, holotype. **a, c.** Dorsal. **b.** Ventral.

ameter; cheliceral length 4.19–7.82 times clypeal height, robust in females, smooth, wrinkled, or with lateral striae; cheliceral teeth heterogeneous, promargin with 6–8, retromargin with 4–9 teeth. Sternum (fig. 80b) length 1.08–1.29 times width, usually heart-shaped, broad to weakly narrowed anteriorly, greatest width 1.47–6.00 times base width, apex pointed; labium broad, length 0.80–1.15 times width, apex entire or weakly notched, base with weak notch. Legs long to elongate, femur I length 1.15–2.24 times carapace width; leg formula 1423 or 1243; usually with annulate markings; palpus usually without anterobasal thorns, with only rows of slender setae with enlarged sockets (fig. 4c), with short, slender thorns rarely present (fig. 4b); origin of calamistrum at 0.40–0.69 distance from metatarsus base, length of calamistrum equal to 0.21–0.42 length of metatarsus, pseudocalamistrum absent; without combs at apices of metatarsi; male metatarsus I usually modified with subbasal retrolateral process and clasping spine, rarely unmodified. Abdomen with dorsal markings variable (fig. 80a, c), venter with longitudinal bands faint to very broad and elaborate (fig. 80b). Male palpus with paired dorsal tibial processes (fig. 79c): a setose median (DA), and a sclerotized, asetose retrodorsal (D), these usually approximate; palpal bulb with spinelike embolus (E) originating probasally and flattened detachable lamellar pars pendula (PP) associated prolaterally (fig. 79b); base of embolus may be associated with a prolateral tegular protuberance (PTP) (fig. 79a); conductor apical, broad, lobate, and desclerotized, with apical groove containing embolus, conductor apex sclerotized, retrolateral; median apophysis (MA) arising retroapically to retrobasally on tegulum (fig. 79a), clavate (fig. 88a) or cylindrical (fig. 82a), directed proximally (fig. 82c) or rarely retrodistally (fig. 88c); reservoir visible through tegular cuticle along proximal

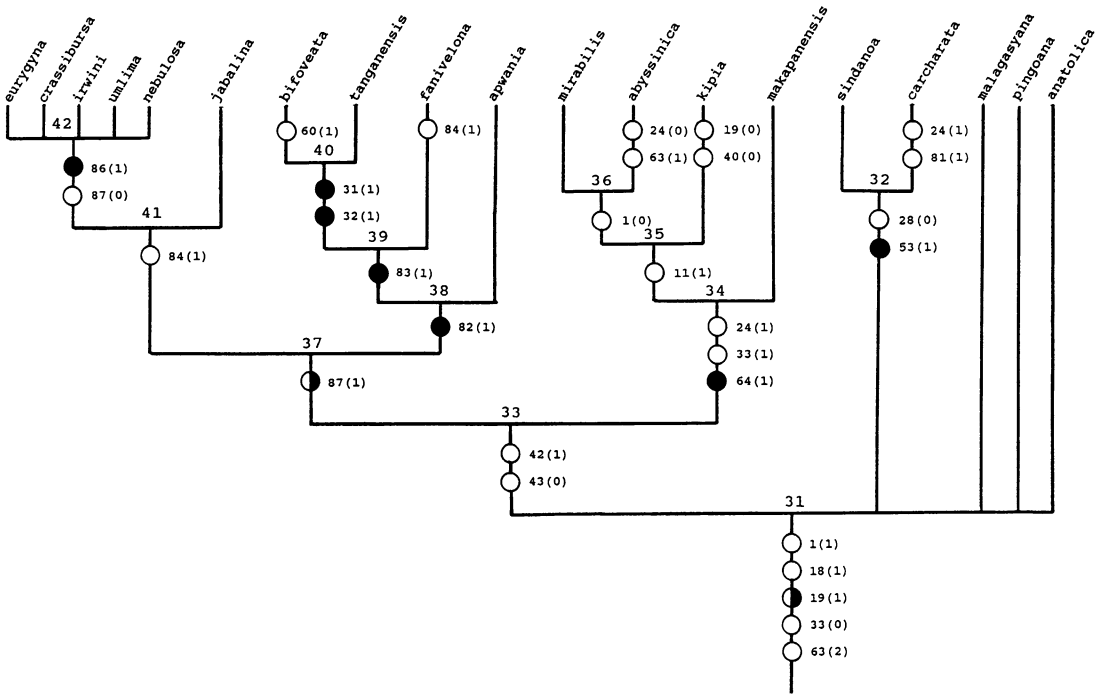

Fig. **81.** Cladogram for the species of *Phyxelida* (shaded circles: unique synapomorphies; half-shaded circles: uniquely derived characters which are subsequently reversed; open circles: homoplasy).

margin. Epigynum (figs. 82d, 99a) with broad, oval posterior median lobe (PML), paired copulatory openings located at anteromedian margin of PML beneath paired lateral transverse ridges (LTR), copulatory openings rarely exposed; spermathecae variable, usually capsulate (figs. 91a–h, 93a–e), with median or anterior afferent and lateral or posterior efferent chambers, fertilization ducts posterior.

COMPOSITION: Nineteen species. Relationships among the species are depicted on the cladogram in figure 81.

DISTRIBUTION: Eastern Africa from the Transvaal to Ethiopia, the eastern Mediterranean, and Madagascar (figs. 111, 112, 113).

Phyxelida mirabilis (L. Koch)

Figures 82a–e, 83a, b, 91c, 111

Tegenaria mirabilis L. Koch, 1875: 34 (male holotype from Hamaszen, Ethiopia, BMNH, examined).

Haemilla mirabilis: Simon, 1909: 29. – Roewer, 1954: 1367. – Bonnet, 1957: 2071.

Phyxelida mirabilis: Lehtinen, 1967: 259.

NOTE: On the basis of geographic proximity I consider an unassociated female from the Simien Mountains to be the female of *mirabilis*. The type locality of *mirabilis* in the Hamaszen Province in Eritrea is approximately 140 km from the Simien, whereas the type locality of *abyssinica*, new species, is more then 300 km from the Simien.

DIAGNOSIS: Male having chelicerae with broad, deep lateral striae; palpal bulb (fig. 82a, c) with MA long, directed proximad, tapering to apex; palpal tibia (fig. 82b) with DA process longer than D process; PTP median, apex of conductor straight, subtegulum visible between conductor and retroapical margin of tegulum; metatarsus I (fig. 83a, b) with clasping spine nearly straight, field of spinules restricted to retrolateral surface. Female with spermathecae (figs. 82e, 91c) spherical, copulatory ducts short, joining spermathecae posteriorly; epigynum as in figure 82d, LTR recurved.

MALE (holotype): Total length 9.19. Entire specimen faded, markings obscure; carapace yellow-brown, pars thoracica with sclerotized

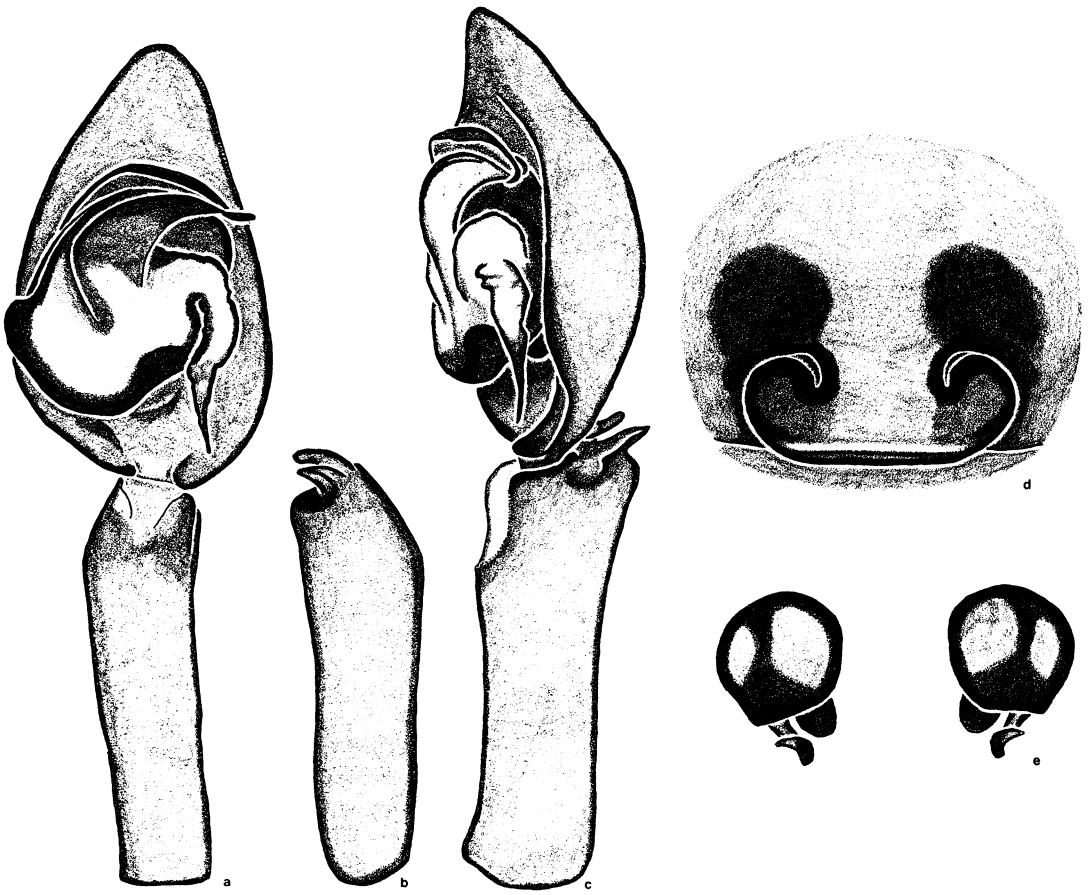

Fig. 82. *Phyxelida mirabilis* (L. Koch). a–c. Holotype of *Tegenaria mirabilis* L. Koch., male palpus. d, e. Female from Simien Mts. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. **d.** Epigynum, ventral. **e.** Spermathecae, dorsal.

anteromedian, median, and posteromedian radii, pars cephalica darkened along margin; appears to have been black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown, venter, legs, and palpi yellow-brown, unmarked; tibiae-tarsi I and II orange-brown; abdomen gray-brown, shriveled, markings obscure. Carapace 4.75 long, 3.78 wide, margin weakly sinuate; thoracic fovea long, deep, length 0.22 carapace, narrow, length 6.00 times width; clypeus 0.37 high; ocular area 0.45 long, 1.18 wide; ratio of eyes AM:AL: PM:PL, 1.00:1.14:1.19:1.33, diameter of PM 0.20; AM separated by ⅖ their diameter, separated from AL by ¾ AM; PM separated by their diameter, separated from PL by 1⅓ PM diameter; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.86 long, slender, with broad lateral striae; promargin of fang furrow with 3 small and 3 large, retromargin with 3 or 4 large teeth and 1 minute tooth. Sternum 2.66 long, 2.06 wide, narrowed anteriorly, margin sinuate, apex pointed; labium 0.81 long, 0.72 wide; palpal coxa 1.47 long, 0.78 wide. Femur I length 1.74 times carapace width; tibia I slightly bent subapically, metatarsus (fig. 83a, b) with short subbasal retrolateral spur surmounted by stout, weakly curved clasping spine, distad of this segment narrowed, with retrolateral band of stout spinules extending nearly to midsegment. Spination: palpus: femur d0-0-1-1; leg I: femur p0-0-1-1-1, r0-0-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-0-0, metatarsus p0-0-0-1, v1-1-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-0-1,

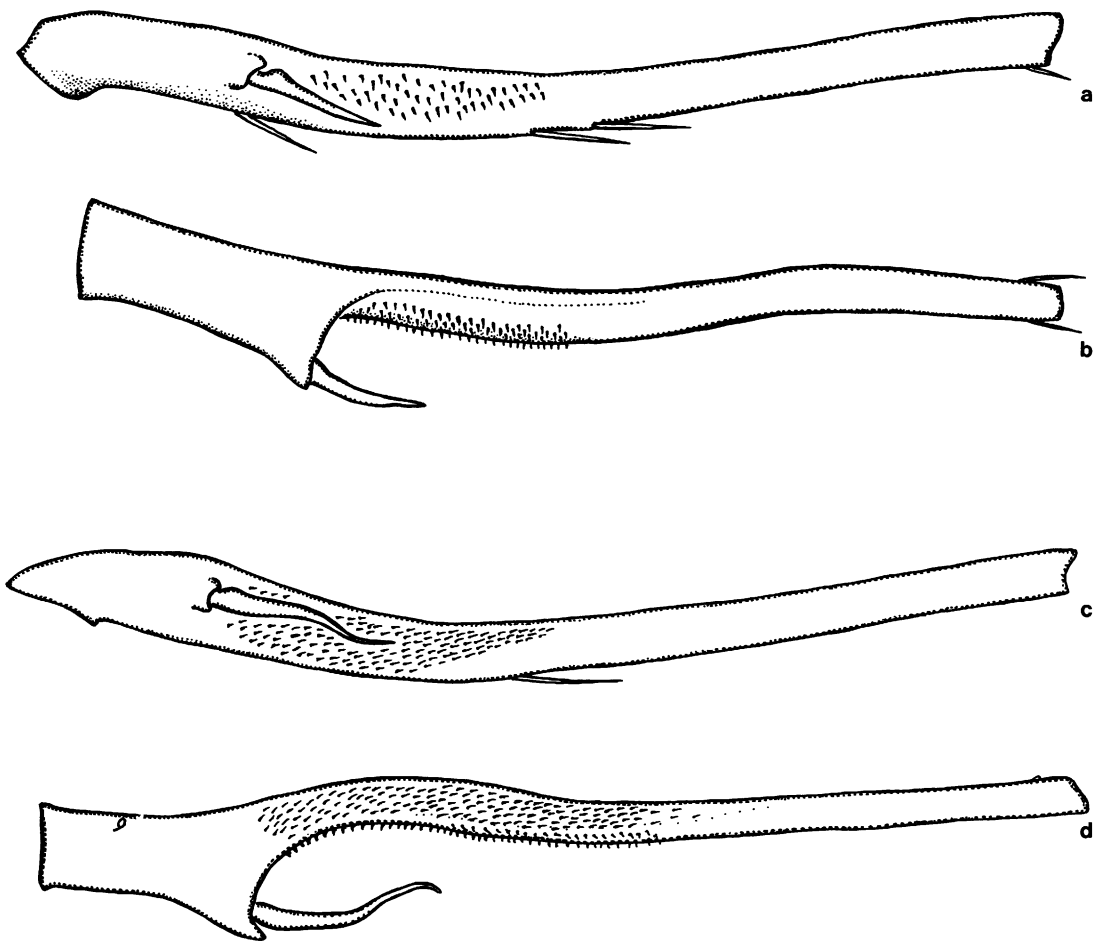

Fig. 83. *Phyxelida* spp., right male metatarsi I. a, b. *mirabilis* (L. Koch) (holotype of *Tegenaria mirabilis* L. Koch). c, d. *abyssinica*, new species, holotype. **a, c.** Retrolateral. **b, d.** Dorsal.

tibia p0-1-1-0, v2-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-2; leg III: femur d1-0-1-0, p0-1-1-1, r0-0-1-0, tibia p0-1-1-0, v2-2-0-2, r1-1-0-2, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d2-1-0-0, tibia p0-0-0-1, v2-0-0-2, r0-0-1-1, metatarsus p1-1-0-2, v2-2-0-1, r0-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	3.28	2.75	2.38	2.94	1.16
Patella	1.16	1.03	0.81	1.03	0.33
Tibia	2.90	2.34	1.81	2.40	0.63
Metatarsus	3.00	2.56	2.06	2.91	—
Tarsus	0.94	0.94	0.81	0.97	0.69
Total	11.28	9.62	7.87	10.25	2.81

Palpal femur with basal group of several rows of slender setae, some with enlarged bases, anterobasal thorns apparently absent; tibia (fig. 82b) with DA process blunt-tipped, longer than broadly triangular D process; apex of cymbium broadly triangular; palpal bulb (fig. 82a, c) with MA originating retroapically on tegulum, directed proximad, cylindrical, tapering to tip; origins of embolus and lamellar pars pendula promedian, with prominent PTP at base, apex of conductor nearly straight, subtegulum visible through large space between apical margin of tegulum and proximal margin of conductor.

FEMALE (Simien Mountains): Total length 8.88. Carapace orange-brown, pars thoracica with anteromedian, median, and posteromedian sclerotized radii, pars cephalica shading to red-brown anteriorly; black pigment surrounding each eye and extending between

AM and between lateral eyes; chelicerae dark red-brown, boss orange-brown; labium and palpal coxa red-brown, lighter at tips; sternum orange-brown, margins darker; coxae, trochanters, legs, and palpi yellow-brown, unmarked except palpal tarsus and tibia-tarsus I orange-brown; abdomen dark gray-brown, with diffuse anterodorsal light spots and posterodorsal light chevrons, venter with pair of broad longitudinal light bands, area between these with diffuse light spot. Carapace 4.44 long, 3.41 wide, margin entire; thoracic fovea long, broad, with deep, rectangular central fossa, length 0.18 carapace; clypeus 0.45 high; ocular area 0.45 long, 1.38 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.33:1.33:1.55, diameter of PM 0.19; AM separated by ⅔ their diameter, separated from AL by 1½ AM; PM separated by 1½ their diameter, separated from PL by 1½ PM; lateral eyes separated by ⅐ PL diameter. Chelicerae 1.87 long, robust, geniculate, promargin of fang furrow with 2 small and 2 large, retromargin with 4 large and 2 minute, and row of 3 minute teeth between margins. Sternum 2.41 long, 1.88 wide, narrowed anteriorly, apex pointed. Femur I length 1.34 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p1-2-1, v0-0-2-2-2-1, r1-0-1; leg I: femur p0-0-1-1-0, tibia p0-0-0-1-0, metatarsus p0-0-0-1, v2-2-1, r0-0-0-1; leg II: femur p0-0-1-1, tibia p0-0-1-0, v0-0-0-1, r0-0-1-0, metatarsus p0-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-0-0-0, p0-0-0-1, tibia p0-0-1-0, v0-0-0-2, r0-0-1-0, metatarsus p0-1-0-2, v2-2-1, r0-1-0-2; leg IV: femur d1-0-0-0, tibia v0-0-0-2, r0-0-0-1, metatarsus p0-0-0-1, v1-1-1, r0-0-0-1. Palpal femur with 2 rows of 6 or 7 slender setae, ventral row longest, without thorns. Calamistrum origin at 0.43 from metatarsus base, length 0.31 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.28	1.84	1.62	2.03	0.84
Patella	0.97	0.81	0.75	0.88	0.34
Tibia	2.09	1.50	1.19	1.75	0.50
Metatarsus	2.09	1.56	1.34	1.81	—
Tarsus	0.94	0.81	0.69	0.78	0.78
Total	8.37	6.52	5.59	7.25	2.46

Epigynum as in figure 82d, LTR gently recurved, hidden laterally beneath PML, copulatory openings exposed, PML broad, width 2.50 times length, oval, sides curved, posterior margin straight; spermathecae as in figure 82e, spherical, copulatory ducts short, joining spermathecae posteriorly; each with afferent chamber median, broadly triangular, efferent chamber lateral, narrow (fig. 91c).

DISTRIBUTION: Uplands of northern Ethiopia (fig. 111).

MATERIAL EXAMINED: ETHIOPIA: *Eritrea*: Hamasen District, (C. Jickeli, BMNH), 1♂ (*Tegenaria mirabilis* L. Koch, type). *Begemder*: Simien Mts., Oct. 23, 1973, elev. 3850 m (G. De Rougemont, MRAC), 1♀.

Phyxelida abyssinica, new species

Figures 83c, d, 84a–c, 111

TYPE: Holotype male from southern Ethiopia, collected in 1904 by H. Neuville, deposited in MNHN.

NOTE: While the locality data on the label are ambiguous, the itinerary for the 1904–1905 Rothschilde and Neuville expedition to Ethiopia took them from Addis Ababa to Djibouti, and it is likely that this specimen was collected in the highlands near Addis Ababa.

ETYMOLOGY: The specific name refers to the occurrence of this species in Ethiopia.

DIAGNOSIS: Male having chelicerae with broad, deep lateral striae; palpal bulb (fig. 84a, c) with MA long, directed proximad, tapering to apex; palpal tibia (fig. 84b) with DA process shorter than D process; PTP basal, apex of conductor slender, sinuate, subtegulum not visible between conductor and retroapical margin of tegulum; metatarsus I (fig. 83c, d) with clasping spine slender, sinuate, band of spinules extending onto retrolateral, dorsal, and prolateral surfaces.

MALE (holotype): Specimen somewhat damaged, abdomen missing. Entire specimen faded to yellow-orange or yellow-white; carapace appears to have had dusky mottling and a broad, dusky, v-shaped mark anteriad of thoracic fovea; ocular area with black pigment surrounding each eye and extending between AM and between lateral eyes; sternum yellow-white, with dusky maculations, labium and palpal coxa yellow-white, lighter at tips; legs yellow-white except metatarsus I sclerotized, orange-brown. Carapace 4.40

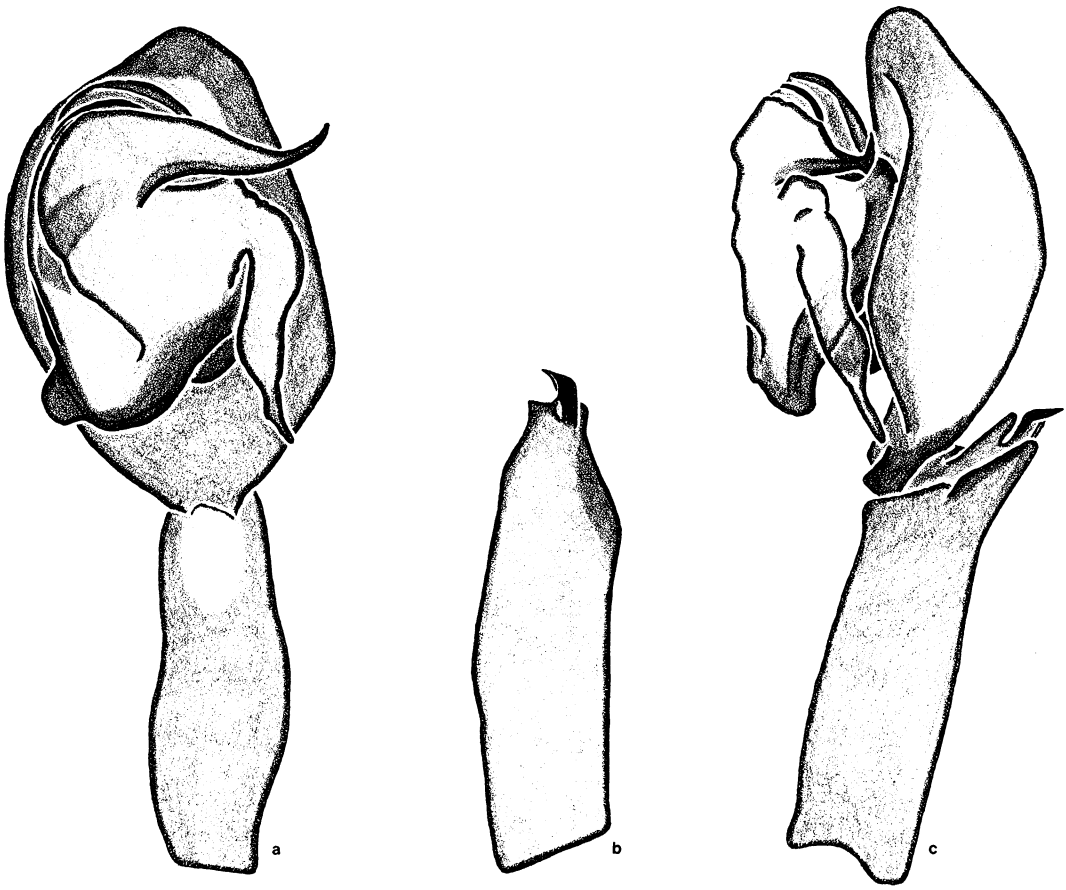

Fig. 84. *Phyxelida abyssinica*, new species, holotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

long, 3.52 wide, margin entire; thoracic fovea deep, narrowed posteriorly, length 0.22 carapace, fovea length 6.00 times width; clypeus 0.34 high; ocular area 0.20 long, 1.20 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.14:1.36:1.43, diameter of PM 0.19; AM separated by ¾ their diameter, separated from AL by ⅘ AM; PM separated by their diameter, separated from PL by 1⅛ PM; lateral eyes nearly contiguous. Chelicerae 1.46 long, with strong lateral subapical striae; promargin of fang furrow with 3 small and 2 large teeth, retromargin with 5 teeth. Sternum 2.40 long, 2.04 wide, margin weakly sinuate, apex prolonged to point; labium 0.80 long, 0.80 wide; palpal coxa 1.40 long, 0.76 wide. Legs long, femur I length 1.97 times carapace width; metatarsus I (fig. 83c, d) with short subbasal retrolateral spur surmounted by slender, sinuate clasping spine, distad of this segment narrowed, with band of slender spinules on retrolateral, dorsal, and prolateral surfaces extending onto apical third of segment. Spination: palpus: femur d0-1-1; leg I: femur p0-0-1-1-1, r0-0-1-0, tibia p0-1-1-0, r0-1-1-0, metatarsus p1-0-0-0, v0-2-0-0, r1-0-0-0; leg II: femur p0-1-1-0, r0-1-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-2-2, r1-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-1; leg III: femur d1-0-0-0, p0-1-1-1, r0-0-1-1, tibia d1-0-0-0, p0-1-1-0, v2-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d2-1-1-0-0-0, p0-0-0-0-1, r0-0-0-0-1, tibia d1-0-0-0, p0-0-1-0, v1-0-0-2, r0-0-1-0, metatarsus p1-1-0-2, v1-1-0-0, r0-0-1-1. Leg measurements:

	I	II	III	IV	Palp
Femur	6.92	5.67	5.00	6.00	2.67
Patella	1.67	1.83	1.58	1.75	0.75
Tibia	5.58	4.50	3.75	4.67	1.25
Metatarsus	6.83	5.33	4.50	5.92	–
Tarsus	2.50	2.08	1.83	2.25	1.50
Total	23.50	19.41	16.66	20.59	6.17

Palpal femur with 3 or 4 rows of slender setae, some with enlarged bases, without anterobasal thorns; tibia (fig. 84b) with DA process short, blunt-tipped, much shorter than the narrowly triangular, hooked D, D process rolled and folded, almost tubular, apex bladelike; apex of cymbium truncate; palpal bulb (fig. 84a, c) with MA originating retroapically on tegulum, directed proximad, cylindrical, tapering to tip; origins of embolus and lamellar pars pendula probasal, with prominent PTP at base, apex of conductor slender, sinuate; apical margin of tegulum and proximal margin of conductor approximate, subtegulum not visible.

FEMALE: Unknown.

DISTRIBUTION: Highlands of south central Ethiopia (fig. 111).

Phyxelida makapanensis Simon

Figures 4c, 6b, 15e, 85a–c, 90e, f, 91a, 111

Phyxelida makapanensis Simon, 1894b: 64 (lectotype female, 4 paralectotype females, and 1 paralectotype male, here designated, from Makapans Cave, South Africa, MNHN, examined). – Roewer, 1954: 1370. – Bonnet, 1958: 3652. – Lehtinen, 1967: 259.

DIAGNOSIS: Male palpal bulb (fig. 85a, c) with MA cylindrical, tapering to apex, directed proximad, embolus spinelike, tegulum with weak, promedian PTP, apex of conductor stout, straight, tapering to a point; chelicerae smooth. Female with epigynum as in figure 90e, LTR transverse, straight, PML rebordered.

MALE (paralectotype): Total length 4.50. Carapace pale yellow-white, unmarked, faint sclerotized radii on pars thoracica and along margin of pars cephalica; ocular area with black pigment anteriad of PM and extending between AM and between lateral eyes; chelicerae pale yellow-brown; venter, legs, palpi and abdomen yellow-white, unmarked. Carapace 2.34 long, 1.88 wide; thoracic fovea long, deep, narrowed posteriorly, length 0.20 carapace; clypeus 0.14 high; ocular area 0.22 long, 0.58 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.75:1.63:2.00, diameter of PM 0.10; AM separated by ¾ their diameter, separated from AL by AM diameter; PM separated by 1¼ their diameter, separated from PL by nearly PM diameter; lateral eyes nearly contiguous. Chelicerae 0.80 long, concave laterally, smooth, promargin of fang furrow with 7 or 8, retromargin with 5 teeth. Sternum 1.31 long, 1.19 wide, broad anteriorly, margin sinuate, apex pointed; labium 0.34 long, 0.39 wide; palpal coxa 0.66 long, 0.33 wide. Legs elongate, length of femur II 2.06 times carapace width; leg I missing from specimen; metatarsus II slender, sinuate. Spination: palpus: femur d1-0-1; leg II: femur p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-2-0-1, r0-1-1-0, metatarsus p0-1-0-0, v2-2-0-1, r0-1-0-0; leg III: femur d1-0-0-1, p0-1-1-1, r0-1-0-1, tibia p1-1-0-1, v1-1-1-2, r1-1-0-1, metatarsus p1-1-0-2, v2-1-0-1, r1-1-0-1; leg IV: femur d1-0-0-0, r0-1-1-1, tibia p0-1-1-0, v1-1-0-2, r0-0-1-0, metatarsus p1-0-0-1, v1-1-1-1, r1-0-0-1. Leg measurements:

	I	II	III	IV	Palp
Femur	–	3.88	3.19	3.88	0.88
Patella	–	1.00	0.88	0.94	0.38
Tibia	–	3.81	2.69	3.94	0.38
Metatarsus	–	3.38	2.75	4.13	–
Tarsus	–	1.38	1.19	1.44	0.75
Total	–	13.45	10.70	14.33	2.39

Palpal femur with row of 2 or 3 anterobasal setae, thorns absent; tibia (fig. 85b) with D process and DA process equal in length, DA cylindrical, blunt-tipped, D conical; palpal bulb (fig. 85a, c) with MA originating retroapically on tegulum, cylindrical, tapering to apex, directed proximad, embolus spinelike, origin of embolus and lamellar pars pendula promedian, tegulum with weak, promedian PTP, apex of conductor stout, straight, tapering to a point.

FEMALE (Wolkberg Cave): Total length 5.63. Carapace pale yellow-brown, unmarked, pars cephalica shading to orange-brown anteriorly; black pigment surrounding each eye and extending between AM; chelicerae orange-brown; labium and palpal coxa dark yellow-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi pale yellow-brown, unmarked; abdomen yellow-white, unmarked. Carapace 2.59 long, 1.91

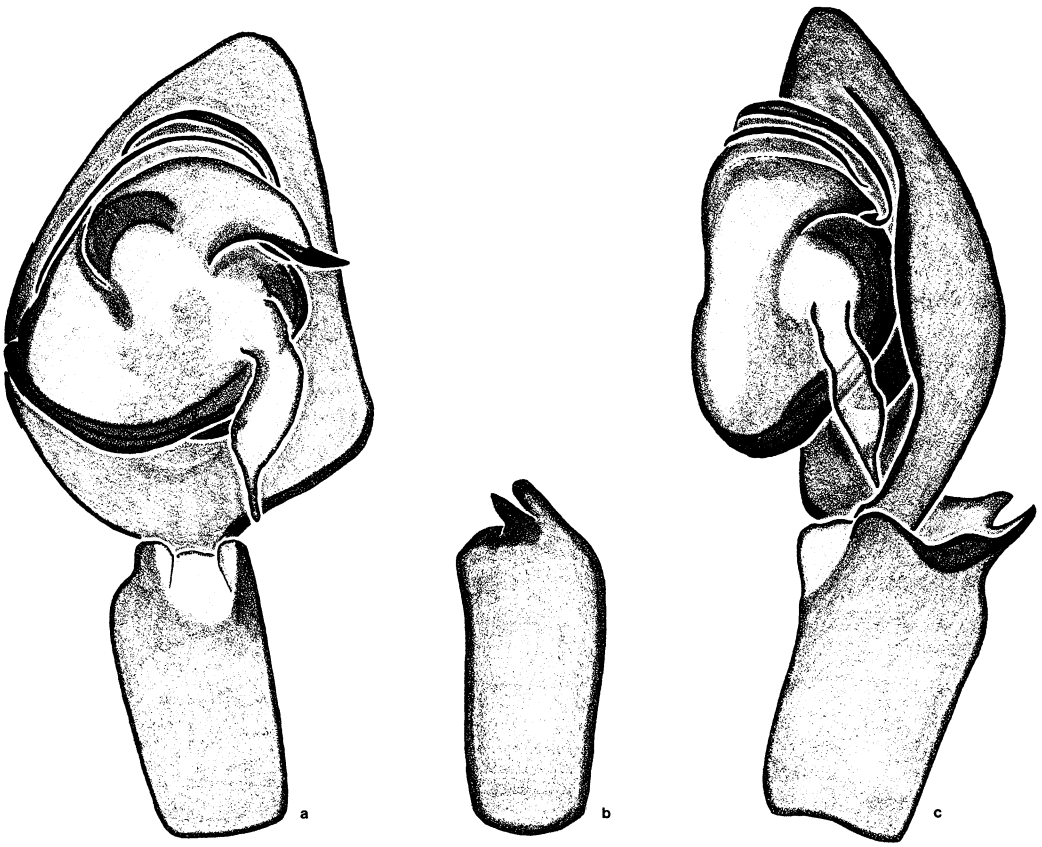

Fig. 85. *Phyxelida makapanensis* Simon, paralectotype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

wide; thoracic fovea short, deep, narrowed posteriorly, length 0.13 carapace; clypeus 0.27 high; ocular area 0.26 long, 0.77 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.00:1.00:1.40, diameter of PM 0.08; AM separated by 3/5 their diameter, separated from AL by 1 3/5 AM; PM separated by twice their diameter, separated from PL by 2 2/5 PM diameter; lateral eyes separated by 1/3 PL diameter. Chelicerae 1.18 long, robust, geniculate, smooth, promargin of fang furrow with 6, retromargin with 5 or 6 teeth. Sternum 1.34 long, 1.09 wide, broad anteriorly, margin entire, apex pointed; labium 0.44 long, 0.47 wide; palpal coxa 0.78 long, 0.44 wide. Legs elongate, femur I length 2.06 times carapace width. Spination: palpus: femur d0-0-1, patella d1-0-1, p0-1-0, tibia d0-0-1, p0-1-1-0, tarsus p2-1-1, v1-1-2-3-2, r0-1-0; leg I: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, r0-0-1-0, metatarsus v2-0-1-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-2-1-0, r0-0-1-0, metatarsus v2-0-1-1; leg III: femur d1-0-0-1, p0-1-1-1, r0-1-0-1, tibia p1-1-1-0, v0-2-0-1, r1-1-1-0, metatarsus p0-1-0-2, v2-0-1-1, r0-1-0-0; leg IV: femur d1-0-0-0, p0-0-0-1, r0-0-1-1, tibia p0-1-1-0, v0-2-0-1, r0-1-1-0, metatarsus p0-1-0-1, v1-1-0-1, r1-0-0-1. Palpal femur with row of 5 slender anterobasal setae, without thorns. Calamistrum origin at 0.49 from metatarsus base, length 0.21 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.94	3.25	2.69	3.50	1.13
Patella	1.06	0.94	0.88	0.94	0.44
Tibia	3.75	3.00	2.19	3.19	0.69
Metatarsus	3.81	2.75	2.38	3.31	—
Tarsus	1.44	1.19	1.06	1.31	1.06
Total	14.00	11.13	9.20	12.25	3.32

Epigynum as in figure 90e, LTR transverse, straight, PML trapezoidal, becoming narrow-

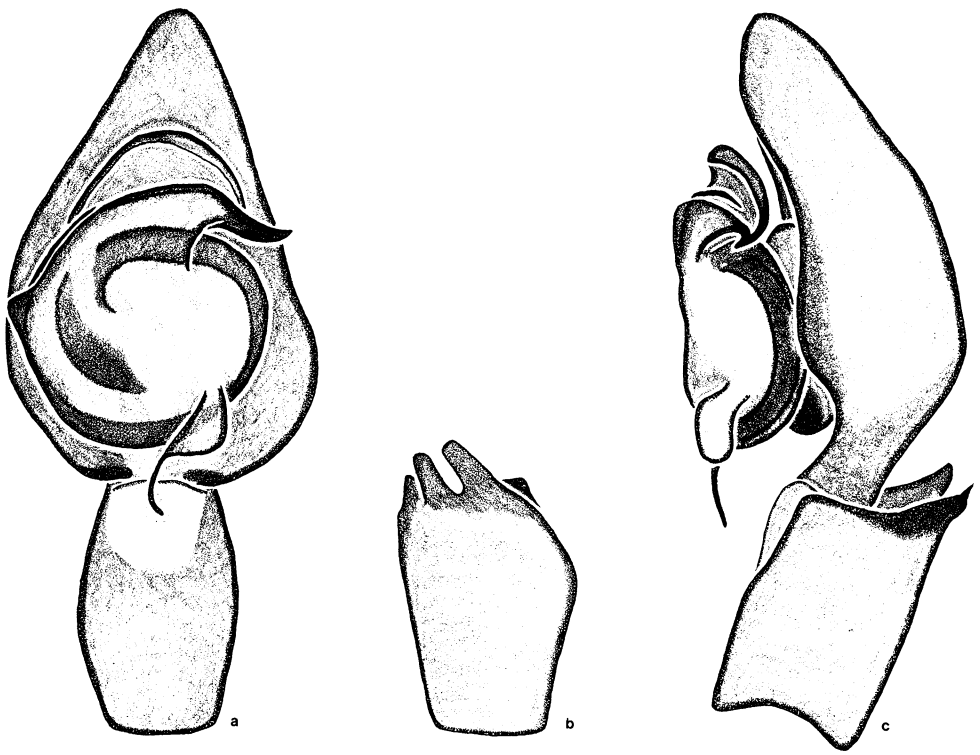

Fig. 86. *Phyxelida kipia*, new species, paratype, male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

er posteriorly, broad, width 3.96 times length, posterior margin rebordered; spermathecae as in figure 90f, capsulate, anterior margins weakly bilobed, copulatory ducts posterior, leading to simple anteromedian afferent chambers, with efferent chambers simple, posterolateral (fig. 91a).

VARIATION: Total length 5.63–6.50; carapace length 1.26–1.41 times width; PER width 1.16–1.25 times AER, 3.00–3.47 times OAL; OQP 1.36–1.40 times OQA, 1.36–1.53 times OQL; cheliceral length 4.35–5.14 times clypeal height, promargin of fang furrow with 6–8, retromargin with 5–8 teeth; sternum length 1.08–1.23 times width; labium length 0.93–1.00 times width; femur I length 1.75–1.85 times carapace width; abdomen all white, unmarked, or with faint paired dark posterodorsal marks.

NATURAL HISTORY: This is the southernmost representative of *Phyxelida*. All published and label data suggest that this species is restricted to caves. In the original description Simon (1894b: 63) stated that these spiders occur deep within Makapans Cave, where they spin their very irregular cribellate webs beneath stones or in cracks on the walls. The flocculent egg sac is attached to the web.

DISTRIBUTION: Northern Transvaal Province, South Africa (fig. 111).

MATERIAL EXAMINED: SOUTH AFRICA: *Transvaal*: Makapans Cave, NE Transvaal, Feb.–Mar. 1893 (E. Simon, MNHN), 1♂, 5♀ (syntypes, *Phyxelida makapanensis* Simon); Wolkberg Cave, first chamber mound, 100 m from main entrance shaft, Mar. 24, 1978 (members of Caving Society of South Africa, NMSA), 1♀; Ohrigstad, Echo Cave, zone profunde, Feb. 26, 1962 (N. Leleup, MRAC) 14♀.

Phyxelida kipia, new species

Figures 79a, b, 86a–c, 87c, d, 111

TYPES: Holotype and paratype males taken from pitfall traps in Mwanihana Forest (7°50′S; 36°50′E) at 1800 m in the Uzungwa

Mountains above Sanje, Mbeya Province, Tanzania (Aug. 18, 1982; M. Stoltze & N. Scharff), deposited in ZMC.

ETYMOLOGY: The specific name is from the Swahili *kipi*, a cock's spur, referring to the form of the first metatarsus.

DIAGNOSIS: Male palpal bulb (figs. 79a, 86a, c) with MA originating retrobasally, apex long and slender, parallel-sided, curved; chelicerae with strong lateral striae; metatarsus I (fig. 87c, d) with short, subbasal, retrolateral spur surmounted by stout, strongly curved clasping spine.

MALE (holotype): Total length 3.75. Carapace pale yellow-brown, pars thoracica dark along margin and with anteromedian, median, and posteromedian reticulate radii extending nearly to thoracic fovea, pars cephalica with broad, dusky, v-shaped mark anteriad of thoracic fovea with longitudinal line on each side extending anteriorly; black pigment surrounding each eye and extending between all but PM; chelicerae, labium, sternum, coxae, trochanters, legs, and palpi pale yellow-brown, unmarked; abdomen pale gray, dorsum with anterior light cardiac mark, venter with pair of faint, broken longitudinal bands. Carapace 1.78 long, 1.34 wide; thoracic fovea narrowed posteriorly, length 0.14 carapace; clypeus 0.11 high; ocular area 0.21 long, 0.50 wide; ratio of eyes AM:AL:PM: PL, 1.00:2.50:2.33:2.67, diameter of PM 0.11; AM separated from each other and from AL by ½ AM diameter; PM separated from each other and from PL by ½ PM diameter; lateral eyes contiguous. Chelicerae 0.77 long, short, with strong lateral striae, promargin of fang furrow with 7, retromargin with 4 teeth. Sternum 1.03 long, 0.88 wide, broad anteriorly, margin entire, apex a right angle. Femur I length 1.74 times carapace width; metatarsus I (fig. 87c, d) with short, subbasal, retrolateral spur surmounted by stout, strongly curved clasping spine, segment slender with retrolateral patch of stout spinules extending just past apex of clasping spine. Spination: palpus: femur d0-1-1; leg I: femur p0-1-1-1, tibia p0-1-1-0, v1-0-2-0, r0-1-1-0, metatarsus p0-0-0-1, v1-0-2-1, r1-0-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-0-0, tibia p0-1-1-0, v1-2-0-1, r0-1-1-0, metatarsus p0-1-0-2, v2-2-0-1, r0-1-0-1; leg III: femur d1-0-0-0, p0-1-0-1, r0-0-0-1, tibia p0-1-1-0, v1-0-2-2, r0-1-1-0, metatarsus p0-1-0-2, v2-1-0-1, r0-1-0-2; leg IV: femur d1-1-0-0-0, tibia p0-0-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r1-0-0-1. Leg measurements:

	I	II	III	IV	Palp
Femur	2.38	1.94	1.63	2.25	0.72
Patella	0.75	0.69	0.63	0.69	0.34
Tibia	2.25	1.63	1.28	1.94	0.28
Metatarsus	2.13	1.69	1.38	2.00	—
Tarsus	1.00	0.88	0.84	0.94	0.66
Total	8.51	6.83	5.76	7.82	2.00

Palpal femur with row of 4 shortened, slender anterobasal setae, without thorns; tibia (fig. 86b) with D process and DA process blunt-tipped, about equal in length, D flattened, DA cylindrical; palpal bulb (fig. 86a, c) with MA originating retrobasally, with broad, clavate base and long, slender, parallel-sided, curved apex; embolus spinelike, origins of embolus and lamellar pars pendula promedian, with prominent PTP at base; apex of conductor broad, tapering to point (fig. 79b).

VARIATION: Total length 3.13–3.75; carapace length 1.26–1.33 times width, unmarked or with faint prefoveal v-shaped mark and short lateral radii on pars thoracica; thoracic fovea 0.14–0.17 length carapace; PER width 1.13–1.17 times AER, 2.25–2.38 times OAL; OQP 1.78–1.93 times OQA; sternum length 1.13–1.18 times width, broad or slightly narrowed anteriorly; labium length 0.80–1.00 times width; femur I length 1.63–1.77 times carapace width.

FEMALE: Unknown.

NATURAL HISTORY: Occurs in forest.

DISTRIBUTION: Known only from the type locality in the Mwanihana Forest, southwestern Tanzania (fig. 111).

ADDITIONAL MATERIAL EXAMINED: TANZANIA: *Mbeya*: Mwanihana Forest (7°50′S; 36°50′E), Uzungwa Mountains above Sanje, pitfall traps, 1800 m elev., Aug. 8, 1982 (M. Stoltze & N. Scharff. ZMC), 2♂.

Phyxelida sindanoa, new species

Figures 79c, d, 80a, b, 87a, b, 88a–e, 112

TYPE: Holotype male from 1950 m elev. near the Kaptega River on the E side of Mt. Elgon, Rift Valley Province, Kenya (Feb. 3, 1979; Å. Holm), deposited in UUZM.

ETYMOLOGY: The specific name is from the

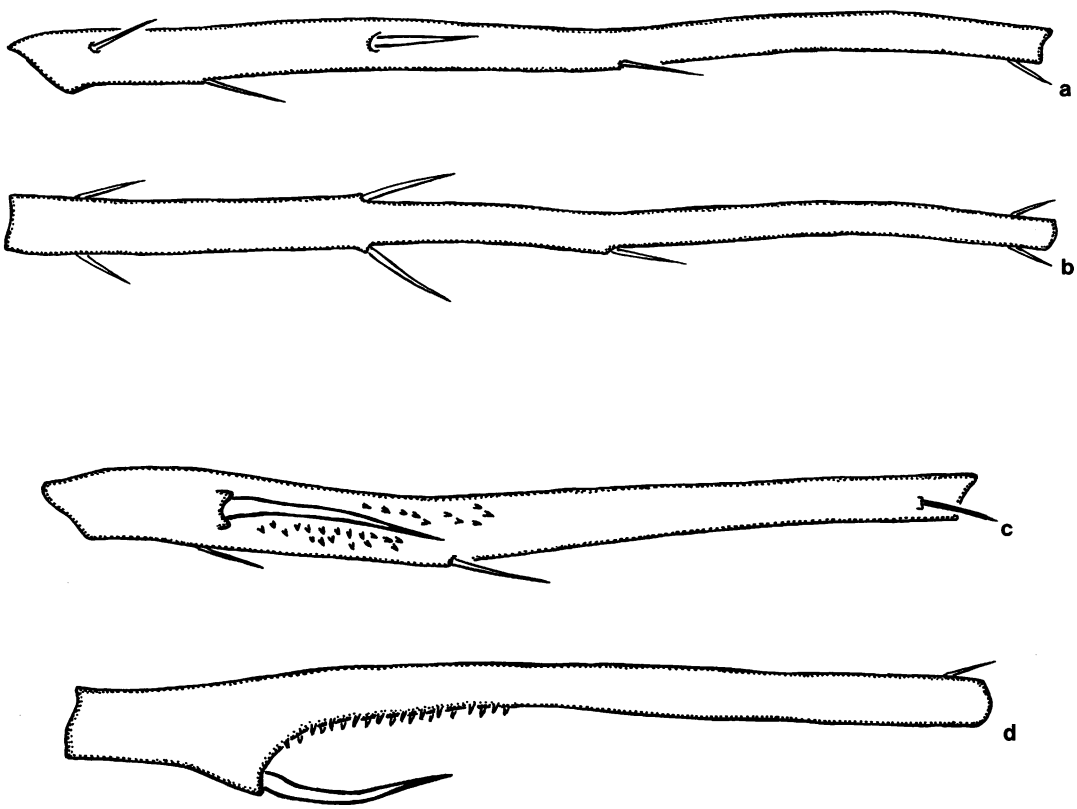

Fig. 87. *Phyxelida* spp., right male metatarsi I. a, b. *sindanoa*, new species, holotype. c, d. *kipia*, new species, holotype. **a, c.** Retrolateral. **b, d.** Dorsal.

Swahili *sindanoa*, or needle, referring to the apex of the conductor.

DIAGNOSIS: Male with metatarsus I unmodified (fig. 87a, b); palpal bulb (fig. 88a, c) with MA short, clavate, directed distad; palpal tibia (fig. 88b) with D process serrate (fig. 79c), curved, longer than and approximate to DA; apex of conductor with 2 or 3 weak serrations. Female with epigynum as in figure 88d, LTR recurved; spermathecae as in figure 88e, simple, copulatory ducts posterior, each with afferent chamber as large as efferent chamber; distinguished from *P. carcharata*, new species, by having the sides of the epigynal PML convex, and the apex of the spermatheca directed anteriad, with the efferent chamber ventral, posterior.

MALE (holotype): Total length 7.88. Carapace with pars thoracica yellow-white, dusky along margin, pars cephalica yellow-brown, darker anteriorly, with broad, dusky, v-shaped mark anteriad of thoracic fovea and fine lines extending anteriad to posterior eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown, boss yellow-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, and trochanters yellow-brown, with dusky markings; legs and palpi yellow-brown, metatarsus-tarsus I orange-brown. Legs III and IV annulate: femora with basal, median, and subapical, patellae with apical, tibiae with median and apical, and metatarsi with apical annuli. Abdomen creamy white, dorsum with paired dark spots and posterodorsal confluent dark chevrons, sides with oblique dark striations, venter with pair of broad, irregular longitudinal light bands, between these mottled with light and dark. Carapace 3.72 long, 2.91 wide, sides entire; thoracic fovea deep, narrowed posteriorly, length 0.15 carapace; clypeus 0.30 high; ocular area 0.43 long, 1.09 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.33:1.11:1.33,

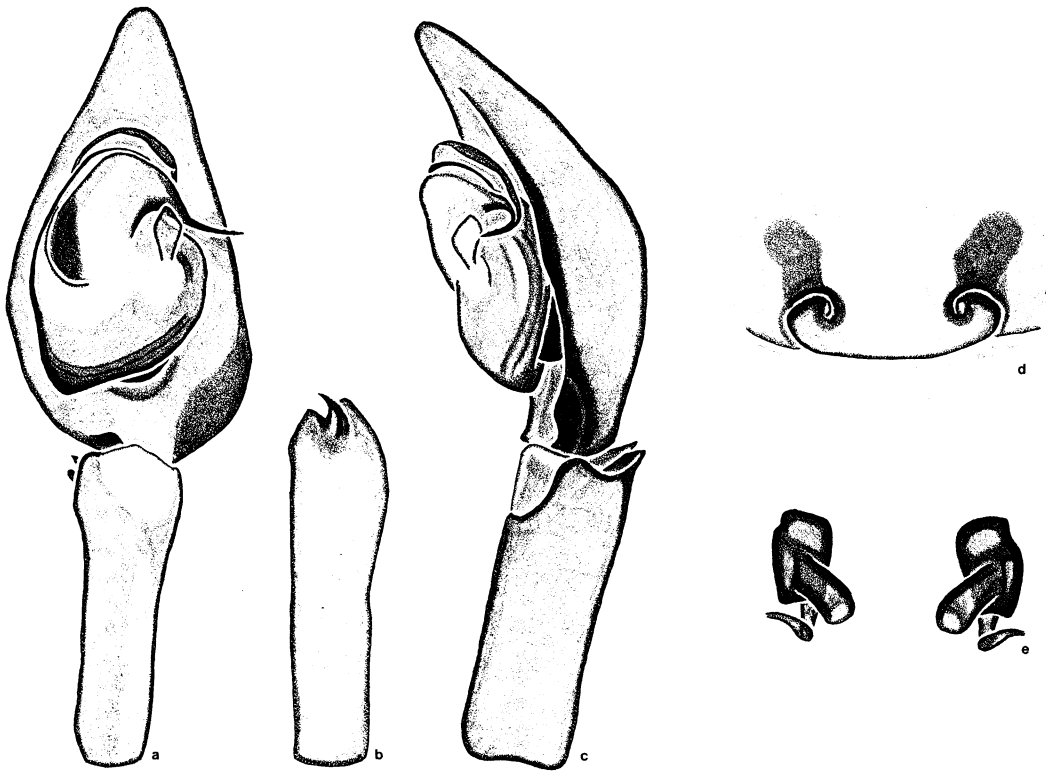

Fig. 88. *Phyxelida sindanoa*, new species. a–c. Holotype, male palpus. d, e. Female, Mt. Elgon. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. **d.** Epigynum, ventral. **e.** Spermathecae, dorsal.

diameter of PM 0.16; AM separated by ⅔ their diameter, separated from AL by AM diameter; PM separated by 1⅛ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.76 long, elongate, with weak posterolateral striae; promargin of fang furrow with 7, retromargin with 4 large and 2 minute teeth. Sternum 1.91 long, 1.66 wide, narrowed anteriorly, margin sinuate, apex pointed; labium 0.72 long, 0.63 wide; palpal coxa 1.25 long, 0.63 wide. Legs elongate, femur I length 1.98 times carapace width; metatarsus I (fig. 87a) with short proximal, slightly enlarged retrolateral spine. Spination: palpus: femur d0-1-1-0; leg I: femur p0-1-1-1, r0-0-1-1, tibia p0-1-1-0, v0-0-1-1-2, r0-1-1-0, metatarsus p2-2-0-1, v2-2-1, r2-2-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-1-1-1, tibia p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-1; leg III: femur d1-1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d1-1-0-0-0, p0-0-0-1, r0-0-1-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-1-2, v2-0-2-1, r1-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	2.88	2.47	2.06	2.53	0.84
Patella	0.84	0.67	0.63	0.69	0.25
Tibia	2.75	2.09	1.66	2.28	0.41
Metatarsus	2.75	2.19	1.78	2.41	—
Tarsus	1.03	0.91	0.78	0.91	0.63
Total	10.25	8.33	6.91	8.82	2.13

Palpal femur with anterobasal row of 6 or 7 slender setae lacking enlarged bases; tibia (figs. 79c, d, 88b) with D process serrate, curved, longer than and approximate to blunt-tipped DA; palpal bulb (fig. 88a, c) with tegulum with MA short, clavate, directed distad; embolus spinelike, origins of embolus and lamellar pars pendula promedian; apex of conductor very slender, weakly curved, pointed, with 2 or 3 weak serrations.

VARIATION: Total length 6.69–7.88; cara-

pace length 1.28–1.36 times width; thoracic fovea 0.15–0.19 length carapace; PER width 1.11–1.14 times AER, 2.41–2.73 times OAL; OQP 1.24–1.41 times OQA, 1.07–1.18 times OQL; cheliceral length 5.20–6.57 times clypeal height, retromargin of fang furrow with 4–6 teeth; labium length 1.05–1.15 times width. Leg markings distinct to obscure; femur I length 1.98–2.11 times carapace width.

FEMALE (Mt. Elgon): Total length 6.68. Markings (fig. 80a, b) as in male except all legs annulate and dark markings of abdomen more extensive, confluent. Carapace 3.09 long, 2.28 wide; thoracic fovea a broad pit, length 0.13 carapace; clypeus 0.24 high; ocular area 0.32 long, 1.01 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.36:1.14:1.29, diameter of PM 0.13; AM separated by 4/5 their diameter, separated from AL by 4/5 AM; PM separated by 1¼ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.34 long, robust, nearly smooth, promargin of fang furrow with 6 large and 1 minute, retromargin with 4 large and 2 minute teeth. Sternum 1.59 long, 1.38 wide, broad anteriorly, otherwise as in male; labium 0.56 long, 0.59 wide; palpal coxa 0.72 long, 0.63 wide. Femur I length 1.84 times carapace width. Spination: palpus: femur d0-0-0-1, patella d1-0-1, tibia d0-0-0-1, p0-1-1-0, tarsus p2-0-2-1, v1-0-1-2-2-1, r1-0-1-0; leg I: femur p0-0-1-0, tibia p0-1-1-0, r0-1-1-0, metatarsus p0-0-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-0-0-0, p0-0-0-1, tibia p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-1; leg III: femur d0-1-0-0, p0-0-0-1, tibia p0-1-1-0, v0-0-0-1, r0-0-1-0, metatarsus p1-1-0-2, v2-0-0-1, r1-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p1-1-0-2, v0-1-1-1, r1-0-0-2. Palpal femur with row of 5 minute anterobasal thorns. Calamistrum origin at 0.41 from metatarsus base, length 0.33 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.19	3.25	2.75	3.63	1.25
Patella	1.25	1.06	1.00	1.13	0.50
Tibia	3.94	2.81	2.18	3.06	0.69
Metatarsus	3.75	2.69	2.25	3.06	—
Tarsus	1.63	1.38	1.25	1.38	1.25
Total	14.76	11.19	9.43	12.26	3.69

Epigynum as in figure 88d, LTR strongly recurved, copulatory openings hidden, PML oval, sides convex, width 3.20 times length, posterior margin weakly procurved; spermathecae as in figure 88e, simple, copulatory ducts posterior, each with apex truncate, directed anteriad, afferent chamber and efferent chamber longitudinal, of equal size, efferent chamber ventral, posterior.

VARIATION: Total length 5.81–7.75; carapace length 1.36–1.42 times width; thoracic fovea 0.13–0.15 length carapace; PER width 1.10–1.24 times AER, 2.52–3.15 times OAL; OQP 1.28–1.50 times OQA, 1.15–1.35 times OQL; cheliceral length 5.47–6.00 times clypeal height, retromargin of fang furrow with 4 or 5 teeth; sternum length 1.16–1.20 times width; labium length 0.94–1.05 times width; leg markings distinct to obscure; abdomen with ventral longitudinal light bands broad and broken (fig. 80b) to narrow and nearly entire.

NATURAL HISTORY: Label data suggest that this species is restricted to montane forest and montane gallery forest.

DISTRIBUTION: Mt. Elgon, east Africa (fig. 112).

ADDITIONAL MATERIAL EXAMINED: KENYA: *Rift Valley*: Mt. Elgon, E side near Kaptega River, Jan. 20, 1987, elev. 1960 m, under stones (Å. Holm, UUZM), 1♀, Kaptega River, Jan. 18, 1979, elev. 1910 m, litter in gallery forest (Å. Holm, UUZM), 1♀; Kapenguria, Kamatira, Aug. 21, 23, 1972, elev. 7000 ft (J. &. F. Murphy, JMC), 2♀.

Phyxelida carcharata, new species

Figures 89a–e, 112

Haemilla nebulosa: Caporiacco, 1949: 323 (misidentification, not *nebulosum* Tullgren 1910).

NOTE: The type of *H. nebulosum* Tullgren 1910 is distinct from the female of *P. carcharata*, new species.

TYPE: Holotype male from "tropical forest on altiplano" at an elevation of 2500–3000 m, Mau, 150 km NW Nairobi, Rift Valley Province, Kenya (Jan. 1946; Toschi & Meneghetti), deposited in MSNV.

ETYMOLOGY: The specific name is from the Greek, *karcharos*, meaning sharp-pointed and jagged, referring to the form of the conductor apex.

DIAGNOSIS: Male with metatarsus I unmodified; palpal bulb (fig. 89a–c) with MA

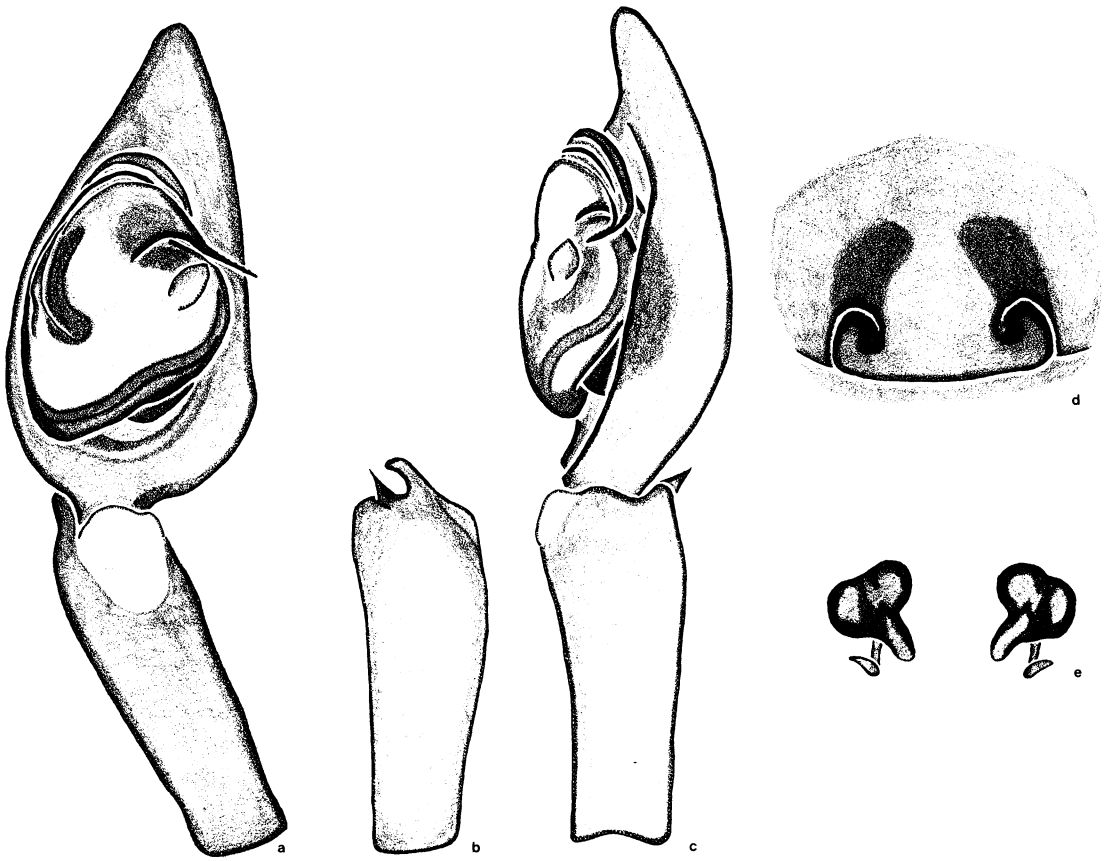

Fig. 89. *Phyxelida carcharata*, new species. a–c. Holotype, male palpus. d, e. Female, Kericho. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. **d.** Epigynum, ventral. **e.** Spermathecae, dorsal.

short, clavate, directed distad; palpal tibia (fig. 89b) with D process smooth, straight, narrow, removed from and shorter than DA; apex of conductor with 5 or more serrations. Female epigynum as in figure 89d, LTR recurved, PML nearly parallel-sided, spermathecae as in figure 89e, simple, each with copulatory duct posterior, afferent chamber equal in size to efferent chamber, distinguished from *P. sindanoa*, new species, by having the apex of the spermatheca directed mesad, and the efferent chamber lateral.

MALE (holotype): Total length 6.19. Carapace orange-brown, pars thoracica dusky along margin, with short, dusky anteromedian, median, and posteromedian radii, pars cephalica with dusky, v-shaped mark anteriad of thoracic fovea and dusky, longitudinal lines on each side extending anteriorly to posterior eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown; labium and palpal coxa pale orange-brown, lighter at tips; sternum, coxae, and trochanters yellow-brown, sternum with transverse dusky markings, coxae and trochanters with dusky maculations; legs and palpi pale yellow-brown. Legs, especially posterior, annulate: femora II–IV with basal, median and subapical, patellae I–IV with apical, tibiae I–IV with median and apical, and metatarsi I–IV with median and apical annuli. Abdomen pale, dorsum with median row of long, narrow chevrons becoming confluent posteriorly and surrounding light chevrons, sides with oblique longitudinal dark maculations, venter with pair of longitudinal light bands, these broad and confluent in center, area between them

and around spinnerets gray-brown. Carapace 2.81 long, 2.16 wide; thoracic fovea broad, shallow, length 0.16 carapace; clypeus 0.27 high; ocular area 0.35 long, 0.88 wide, PER weakly procurved; ratio of eyes AM:AL:PM: PL, 1.00:1.67:1.46:1.33, diameter of PM 0.14; AM separated by 4/5 their diameter, separated from AL by 3/4 AM; PM separated from PM and from PL by about PM diameter; lateral eyes separated by 1/4 PL. Chelicerae 1.29 long, with weak lateral and broad, shallow ventral wrinkles, promargin of fang furrow with 6, retromargin with 2 small and 2 large teeth. Sternum 1.47 long, 1.31 wide, apex pointed; labium 0.53 long, 0.50 wide; palpal coxa 0.88 long, 0.50 wide. Legs elongate, femur I length 2.17 times carapace width; metatarsus with short proximal, retrolateral clasping spine. Spination: palpus: femur d0-0-1; leg I: femur p0-1-0-1-1, r0-1-0-1-1, tibia p0-1-1-0, v0-0-1-1-2, r0-1-1-0, metatarsus p0-1-0-0-1, v2-0-2-0-1, r0-1-0-0-1; leg II: femur p1-0-1-1, r1-0-1-1, tibia p0-1-1-0, v0-0-1-0, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r0-1-0-1; leg III: femur d1-0-0-0, p0-1-1-1, r0-1-1-1, tibia p0-1-1-0, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0-0, p0-0-0-1-1, r0-0-0-0-1, tibia p0-1-1-0, r0-1-1-0, metatarsus p1-0-1-0-2, v2-1-0-1, r1-0-0-1. Leg measurements:

	I	II	III	IV	Palp
Femur	4.69	3.88	3.25	4.00	1.38
Patella	1.13	1.00	0.94	1.06	0.38
Tibia	4.44	3.25	2.50	3.44	0.69
Metatarsus	4.50	3.44	2.75	3.63	—
Tarsus	1.75	1.50	1.38	1.69	1.06
Total	16.51	13.07	10.82	13.82	3.51

Palpal femur with row of 4 or 5 short, slender anterobasal setae with enlarged bases; tibia (fig. 89b) with D process smooth, straight, very narrow, acutely pointed, removed from and shorter than blunt-tipped DA; palpal bulb (fig. 89a, c) with tegulum with MA short, clavate, directed distad; embolus spinelike, origins of embolus and lamellar pars pendula promedian, apex of conductor straight, slender, acutely pointed, with 5 or more serrations.

FEMALE (Kericho): Total length 8.38. Markings as in male except pars cephalica with dusky reticulations laterad of eyes near margin; chelicerae red-brown, boss yellow-brown; palpal tarsus and metatarsus-tarsus I orange-brown; abdomen dark gray mottled with white, dorsum with diffuse light anterodorsal mark and diffuse median chevrons, venter with pair of broad, light longitudinal bands, between these 3 pairs of light spots. Carapace 3.66 long, 2.97 wide; thoracic fovea deep, wide, narrowed posteriorly, length 0.24 carapace; clypeus 0.32 high; ocular area 0.42 long, 1.14 wide; ratio of eyes AM:AL:PM: PL, 1.00:1.22:1.11:1.28, diameter of PM 0.16; AM separated by 2/3 their diameter, separated from AL by 3/4 AM; PM separated by their diameter, separated from PL by 1 1/3 PM; lateral eyes separated by 1/4 PL diameter. Chelicerae 1.70 long, robust, promargin of fang furrow with 7 large and 1 minute, retromargin with 1 minute, 4 large, and 2 minute teeth. Sternum 1.91 long, 1.63 wide, slightly narrowed anteriorly, apex pointed; labium 0.72 long, 0.63 wide; palpal coxa 1.25 long, 0.75 wide. Femur I length 1.77 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p2-0-1-0, v0-0-1-1-2-1, r1-0-0-0; leg I: femur d0-1-1-1, r0-1-1-1-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-0-0-1, v2-0-2-1, r0-1-0-1; leg II: femur p0-1-1-1, r0-1-1-1-1, tibia p0-1-1-0, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg III: femur d0-0-0-1, p0-0-1-1, r0-1-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, r0-1-1-0, metatarsus p1-0-0-2, v0-2-2-1, r1-0-0-2. Palpal femur with row of 3 or 4 short, slender, anterobasal thorns. Calamistrum origin at 0.43 from metatarsus base, length 0.26 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	5.25	4.44	3.56	4.31	1.81
Patella	1.43	1.31	1.22	1.31	0.56
Tibia	5.00	3.50	2.69	3.81	1.00
Metatarsus	4.87	3.50	2.94	3.81	—
Tarsus	1.94	1.63	1.50	1.69	1.63
Total	18.49	14.38	11.91	14.93	5.00

Epigynum as in figure 89d, LTR recurved, copulatory openings hidden, PML broad, width 2.91 times length, trapezoidal, nearly parallel-sided, broadest posteriorly, posterior margin straight; spermathecae as in figure 89e, simple, copulatory ducts posterior, each with

Fig. 90. *Phyxelida* spp., female genitalia. a, b. *pingoana*, new species. a. Endebess cave. b. Paratype. c, d. *anatolica*, new species, paratype. e, f. *makapanensis* Simon, paralectotype. **a, c, e.** Epigyna, ventral. **b, d, f.** Spermathecae, dorsal.

afferent chamber and efferent chamber equal in size, apex and afferent chamber directed mesad, efferent chamber simple, lateral.

NATURAL HISTORY: Label data suggest that this species occurs in moist montane forest.

DISTRIBUTION: Uplands of central Rift Valley region of Kenya (fig. 112).

ADDITIONAL MATERIAL EXAMINED: KENYA: *Rift Valley*: 10 km E Kericho, Dec. 17, 1977, from moss on trees in rain forest, elev. 2200 m (Å. Holm, UUZM), 1♀.

Phyxelida pingoana, new species
Figures 90a, b, 91b, 113

TYPES: Holotype female from Kitum Cave at 2500 m elev., Mt. Elgon National Park, Western Province, Kenya (Jan. 28, 1975; Å.

Holm), deposited in UUZM; paratypes, 3 females, same data, 1 deposited in AMNH, remainder in UUZM.

ETYMOLOGY: The specific name is from *pingo*, a Swahili word for cave.

DIAGNOSIS: Female with epigynum as in figure 90a, LTR recurved, copulatory openings exposed; spermathecae as in figure 90b, copulatory ducts median.

FEMALE (paratype): Total length 10.50. Carapace orange-brown, unmarked, pars cephalica darkened along margin and shading to red-brown anteriorly; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown, boss orange-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, unmarked except sternum with faint dusky markings; palpal tarsus and metatarsus-tarsus I shading to orange-brown; abdomen creamy white, dorsum with dark spots and posterodorsal confluent dark chevrons, sides with oblique dark striations, venter with pair of broad, irregular longitudinal light bands, between these mottled with light and dark. Carapace 4.75 long, 3.59 wide; thoracic fovea broad, deep, narrowed posteriorly, length 0.16 carapace; clypeus 0.48 high; ocular area 0.42 long, 1.33 wide, PER weakly procurved; ratio of eyes AM:AL:PM:PL, 1.00: 1.16:1.16:1.37, diameter of PM 0.18; AM separated by their diameter, separated from AL by slightly greater than AM diameter; PM separated by 1¼ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ½ PL diameter. Chelicerae 2.30 long, robust, smooth, pro- and retromargins of fang furrow with 8 teeth. Sternum 1.38 long, 1.22 wide, broad anteriorly, margin sinuate, apex pointed; labium 0.47 long, 0.50 wide; palpal coxa 0.78 long, 0.47 wide. Legs elongate, femur I length 2.24 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p2-2-1, v1-0-1-1-1-3-2, r1-0-0; leg I: femur p0-1-1-1, r0-1-1-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-0-1, r0-1-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-1-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-0-1-1-1, r0-1-1-1-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, p0-0-0-1, r0-0-1-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-0-1-2, v2-2-1, r1-0-0-2. Palpal femur with row of 5 slender anterobasal setae, thorns absent. Calamistrum origin at 0.40 from metatarsus base, length 0.36 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	8.06	6.75	5.75	6.69	2.19
Patella	2.25	2.00	1.81	2.00	0.81
Tibia	7.81	5.86	4.56	5.75	1.38
Metatarsus	7.75	5.86	4.88	5.75	—
Tarsus	3.06	2.63	2.44	2.50	2.19
Total	28.93	23.10	19.44	22.69	6.57

Epigynum as in figure 90a, LTR recurved, copulatory openings exposed, PML oval, sides angled, broadest posteriorly, width 3.38 times length; spermathecae as in figure 90b, with median and lateral capsules, copulatory ducts median, each with afferent chamber and efferent chamber simple, of equal size, afferent chamber median, efferent chamber lateral (fig. 91b).

VARIATION (Mt. Elgon & Mt. Kenya): Total length 8.75–12.50; carapace unmarked or with faint prefoveal v-shaped dusky mark and thin lines extending anteriad onto pars cephalica; thoracic fovea oval or narrowed posteriorly; PER width 1.06–1.20 times AER, 2.88–3.62 times OAL; OQP 1.20–1.38 times OQA, 1.25–1.60 times OQL; cheliceral length 4.80–5.48 times clypeal height, retromargin of fang furrow with 7 or 8 teeth; sternum length 1.20–1.26 times width; labium length 1.03–1.09 times width. Legs uniformly marked or with faint annuli on posterior legs; femur I length 2.11–2.24 times carapace width; epigynum with PML oval to trapezoidal, posterior margin straight to convex.

MALE: Unknown.

NATURAL HISTORY: All label data concerning natural history suggest that this species is restricted to montane caves.

DISTRIBUTION: Highlands of southwestern Kenya (fig. 113).

ADDITIONAL MATERIAL EXAMINED: KENYA: *Rift Valley*: Mt. Elgon National Park, Chepnyalil Cave, Jan. 10, 1976, elev. 2400 m (Å. Holm, UUZM), 1♀; Mt. Elgon, Endebess cave, Aug. 20, 1972, elev. 9000 ft (J. & F. Murphy, JMC), 2♀. *Central*: Mt. Kenya, July 1975 (R. Bosmans, MRAC), 1♀.

Phyxelida anatolica, new species
Figures 90c, d, 111

Amaurobius fenestralis: Roewer, 1959: 34 (misidentification, not *Amaurobius fenestralis* (Stroem) 1769. – Lehtinen, 1967: 329.

TYPES: Holotype and 2 paratype females from The Great Cave of Magharadijk, near Soueidiyé (Samendagh), Antakya (Antioch), Turkey (June 22, 1953; K. Lindberg), deposited in GMZ.

ETYMOLOGY: The specific name refers to the occurrence of this species in Turkey.

DIAGNOSIS: Female with epigynum as in figure 90c, without apparent LTR, copulatory openings exposed; spermathecae as in figure 90d, each with small, slender, median afferent chamber.

FEMALE (paratype): Total length 7.00. Carapace pale yellow-brown, unmarked, pars cephalica shading anteriorly to orange-brown; black pigment anterior of PM and extending between AM and between lateral eyes; chelicerae orange-brown; labium and palpal coxa pale orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi pale yellow-brown, unmarked; abdomen pale gray, unmarked except for faint pair of thin, longitudinal light bands on venter. Carapace 3.09 long, 2.31 wide; thoracic fovea broad, deep, length 0.11 carapace; clypeus 0.18 high; ocular area 0.27 long, 0.88 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.64:1.18:1.64, diameter of PM 0.10; AM separated by ¾ their diameter, separated from AL by 1⅔ AM; PM separated by 1⅔ their diameter, separated from PL by 1⅘ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.38 long, robust, smooth, promargin of fang furrow with 6 or 7, retromargin with 4 or 5 teeth. Sternum 1.66 long, 1.34 wide, broad anteriorly, apex a right angle; labium 0.59 long, 0.59 wide; palpal coxa 0.97 long, 0.53 wide. Femur I length 1.68 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p2-1-1, v1-1-1-2-2-3, r1-0-0; leg I: femur p0-1-1-1, tibia p0-1-1-0, v0-0-2-1, r1-1-0-2, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur p0-0-1-1, tibia p0-1-1-0, v0-0-2-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg III: femur p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v0-0-2-2, r0-1-1-0, metatarsus p1-1-0-2, v1-0-2-1, r0-1-0-2; leg IV: femur d1-0-0-0, tibia p0-0-1-0, v0-0-0-2, r0-0-1-0, metatarsus p0-0-1-2, v0-2-0-1, r1-0-0-2. Palpal femur with scattered slender anterobasal setae, without thorns. Calamistrum origin at 0.47 from metatarsus base, length 0.22 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.88	3.00	2.63	3.56	1.13
Patella	1.31	1.19	1.06	1.00	0.56
Tibia	3.63	2.50	2.06	3.06	0.69
Metatarsus	3.31	2.50	2.19	2.94	–
Tarsus	1.31	1.19	1.06	1.25	1.19
Total	13.44	10.38	9.00	11.81	3.57

Epigynum as in figure 90c, without apparent LTR, copulatory openings exposed, median, PML broad, width 3.15 times length, rectangular, sides parallel, posterior margin straight; spermathecae as in figure 90d, copulatory ducts posterior, each with small, slender, median afferent chamber and large, spherical, lateral efferent chamber.

VARIATION: Total length 4.69–7.81; carapace length 1.34–1.40 times width; thoracic fovea 0.11–0.14 length carapace; PER width 1.11–1.17 times AER, 3.07–3.33 times OAL; OQP 1.47–1.54 times OQA, 1.33–1.48 times OQL; cheliceral length 5.11–7.82 times clypeal height; sternum length 1.18–1.23 times width; labium length 0.89–1.00 times width.

MALE: Unknown.

NATURAL HISTORY: This is the northernmost representative of *Phyxelida* and, like *P. makapanensis*, the southernmost representative of the genus, it appears to be restricted to caves.

DISTRIBUTION: Southwestern Turkey, near the Syrian border (fig. 111).

Phyxelida malagasyana, new species
Figures 80c, 91d, 92a, c, 111

TYPES: Holotype and paratype females from 2100 m at Majakatompo in the Ankaratra Mountains (19°25'S; 47°12'E), Tananarive District, Madagascar (Nov. 25, 1959; E. S. Ross), deposited in CAS.

ETYMOLOGY: The specific name refers to the occurrence of this species in Madagascar.

DIAGNOSIS: Epigynum as in figure 92a, PML broad, width greater than 3 times length, oval; spermathecae as in figures 92c and 91d, each with long, anteromedian lobe ending in apical bulb, and with posterior dorsolateral lobe.

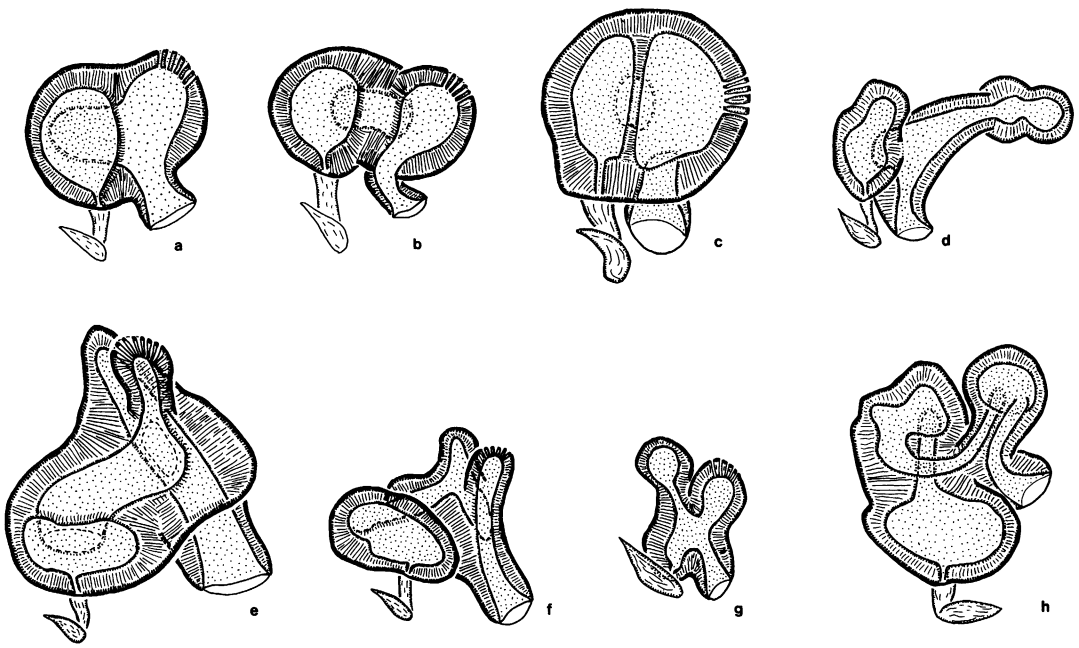

Fig. 91. Left spermathecae of *Phyxelida*, cleared, dorsal views. **a.** *makapanensis* Simon, paralectotype. **b.** *pingoana*, new species, paratype. **c.** *mirabilis* (L. Koch), Simien Mts. **d.** *malagasyana*, new species, paratype. **e.** *bifoveata* (Strand), Musvenene-Kyondo Forest. **f.** *tanganensis* (Simon and Fage), Kulumuzi. **g.** *apwania*, new species, holotype. **h.** *fanivelona*, new species, paratype.

FEMALE (holotype): Total length 7.00. Carapace (fig. 80c) orange-brown, pars thoracica with margin dusky and with dusky anteromedian and median reticulate markings widening toward margin and posteriorly; with broad, dusky, v-shaped mark anteriad of thoracic fovea extending anteriorly as median line and line on each side of pars cephalica with extensions to AL and AM; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown; labium and palpal coxa red-brown, tips lighter; sternum, coxae, trochanters, legs and palpi yellow-brown; sternum and coxae dusky; palpal tarsus, tibia I, and metatarsi–tarsi I and II red-brown. Legs with faint dusky annuli: basal, median and apical on femora II–IV, apical on patellae II–IV, and median and apical on tibiae and metatarsi II–IV. Abdomen gray-brown, dorsum (fig. 80c) with anteromedian light paired marks and series of chevrons posteriorly, sides mottled with oblique longitudinal light and dark, venter with longitudinal pair of narrow light bands. Carapace 3.09 long, 2.25 wide; thoracic fovea broad, short, deep, length 0.08 carapace length; clypeus 0.26 high; ocular area 0.34 long, 0.99 wide; ratio of eyes AM:AL: PM:PL, 1.00:1.29:1.14:1.29, diameter of PM 0.13; AM separated by ⅘ their diameter, separated from AL by 1⅛ AM; PM separated by 1⅛ their diameter, separated from PL by 1¾ PM; lateral eyes separated by ½ PL diameter. Chelicerae 1.38 long, robust, smooth, promargin of fang furrow with 6, retromargin with 4 large teeth and 1 minute tooth. Sternum 1.66 long, 1.34 wide, margin entire, apex pointed; labium 0.58 long, 0.52 wide; palpal coxa 0.97 long, 0.53 wide. Femur I length 1.89 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p1-0-1-0, v0-0-1-3-1-2-2, r0-0-2-0; leg I: femur d0-1-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p0-1-0-1, v2-1-0-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-1-1-1, r0-1-0-1, tibia d1-0-0-0, p0-1-1-0, v2-2-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-2-1, r1-1-0-2; leg III: femur d0-1-0-0, p0-0-1-1, r0-0-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-

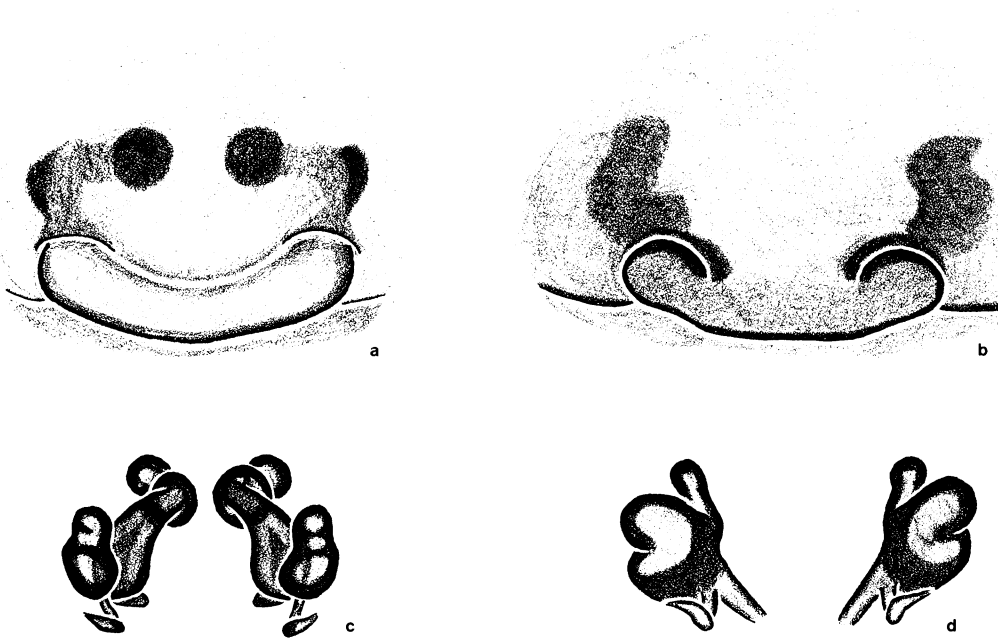

Fig. 92. *Phyxelida* spp., female genitalia. a, c. *malagasyana*, new species, paratype. b, d. *jabalina*, new species, holotype. **a, b.** Epigyna, ventral. **c, d.** Spermathecae, dorsal.

0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-1-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-0-0-2, v0-2-1-1, r1-0-0-2. Palpal femur with row of 8 short, slender anterobasal thorns. Calamistrum origin at 0.48 from metatarsus base, length 0.33 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.25	3.56	3.00	3.81	1.31
Patella	1.31	1.13	0.94	1.06	0.56
Tibia	3.88	2.81	2.25	3.06	0.69
Metatarsus	3.81	2.81	2.25	3.25	–
Tarsus	1.75	1.38	1.25	1.38	1.31
Total	15.00	11.69	9.69	12.56	3.87

Epigynum as in figure 92a, copulatory openings hidden beneath recurved LTR, PML broad, width 3.34 times length, oval, posterior margin gently procurved; spermathecae as in figure 92c, each with posteromedian copulatory duct leading to afferent duct within long, anteromedian lobe ending in apical bulb, and with posterior dorsolateral lobe containing spherical efferent chamber (fig. 91d).

VARIATION: Total length 6.63–7.00; carapace length 1.38–1.45 times width; thoracic fovea 0.08–0.11 length carapace; PER width 2.61–2.95 times OAL; OQP 1.29–1.33 times OQA, 1.27–1.42 times OQL; cheliceral length 5.19–5.38 times clypeal height; sternum length 1.19–1.23 times width; labium length 1.03–1.12 times width; femur I length 1.89–1.97 times carapace width.

MALE: Unknown.

DISTRIBUTION: Highlands of central Madagascar (fig. 111).

ADDITIONAL MATERIAL EXAMINED: MADAGASCAR: *Majunga*: Andriamena, 1400 m (J. Vergues, MRAC), 1♀.

Phyxelida jabalina, new species

Figures 92b, d, 93a, 113

TYPES: Female holotype from Olkokola, savanna with *Hagenia*, north west slope, 2850 m, Mt. Meru, Arusha Province, Tanzania (June 24–25, 1957; P. Basilewsky & N. Leleup), deposited in the MRAC. Paratype female, same data.

ETYMOLOGY: The specific name is from *jabali*, a Swahili word for mountain.

DIAGNOSIS: Female with spermathecae as

in figures 92d and 93a, anterior margin with slender anteroventral lobes and very broad anterodorsal lobe; epigynum as in figure 92b, PML broad, width greater than twice length.

FEMALE (holotype): Total length 6.33. Carapace orange-brown, pars thoracica darkened along margin and with faint anterolateral, lateral, and posterolateral radii; pars cephalica with broad, dusky, v-shaped mark anteriad of thoracic fovea, with faint, dusky maculations on each side extending anteriorly to ocular area; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, and trochanters yellow-brown, suffused with dusky pigment; legs and palpi yellow-brown, palpal tarsus and metatarsus to tarsus I shading to orange-brown, unmarked except for faint lateral dusky maculations on femora to tibiae III and IV; abdomen gray, dorsum with median row of 5 pale chevrons, sides mottled with light gray, venter with faint narrow parallel light gray bands. Carapace 2.64 long, 1.92 wide, margin weakly sinuate; thoracic fovea broad, deep, length 0.14 carapace; clypeus 0.22 high; ocular area 0.30 long, 0.80 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.20:1.40:1.40, diameter of PM 0.14; AM separated by ⅔ their diameter, separated from AL by AM diameter; PM separated by their diameter, separated from PL by PM diameter. Chelicerae 1.16 long, smooth, promargin of fang furrow with 5, retromargin with 6 uneven teeth. Sternum 1.40 long, 1.20 wide, margin angled, apex pointed; labium 0.44 long, 0.48 wide; palpal coxa 0.84 long, 0.52 wide. Femur I length 1.56 carapace width. Spination: palpus: femur d0-0-1, tibia p2-0-1, tarsus p2-2-1, v0-0-0-3-2-3, r0-2-1; leg I: femur d0-1-0-0, p0-0-1-0, tibia p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p0-1-0-2, v2-2-1, r0-1-0-1; leg II: femur d1-1-0-0, p0-0-1-1, tibia p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p0-1-0-2, v2-2-1, r0-1-0-2; leg III: femur d1-1-0-0, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r0-1-0-2; leg IV: femur d1-0-0-0, p0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-0-0-2, v2-1-0-1, r1-0-0-2. Palpal femur with anterobasal row of slender setae in enlarged bases, distal 2 thickened. Calamistrum origin at 0.46 from metatarsus base, length 0.38 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	3.00	2.42	2.00	2.67	1.13
Patella	1.00	0.92	0.83	0.96	0.50
Tibia	2.75	2.00	1.67	2.25	0.67
Metatarsus	2.58	1.92	1.67	2.33	–
Tarsus	1.33	1.17	1.00	1.25	1.21
Total	10.66	8.43	7.17	9.46	3.51

Epigynum as in figure 92b, LTR recurved, largely hidden beneath PML, PML oval, width 2.89 times length, sides curved, posterior margin weakly produced medially; spermathecae as in figure 92d, posterior copulatory ducts leading to small, anteromedian afferent chambers, anterior margin of each spermatheca with small, slender anteroventral lobe and broad posterodorsal lobes, large lateral efferent chamber leading to posterior looped duct connecting to fertilization duct (fig. 93a).

MALE: Unknown.

NATURAL HISTORY: The label data suggest occurrence in and near montane forests.

DISTRIBUTION: Known only from the type locality at Mt. Meru, Tanzania (fig. 113).

Phyxelida nebulosa (Tullgren)

Figures 93e, 94a, c, 113

Amphigyrum nebulosum Tullgren, 1910: 93 (female lectotype and paralectotype, here designated, from Mt. Kilimanjaro, "German East Africa", NRS, examined). – Bonnet, 1955: 300.

Haemilla nebulosa: Berland, 1914: 59. – Roewer, 1954: 1367.

Phyxelida nebulosa: Lehtinen, 1967: 259.

NOTE: Tullgren described females from Mts. Kilimanjaro and Meru. According to Dr. T. Kronestedt of the NRS a single female from Mt. Meru now lacks the epigynum. Accordingly the intact females from Mt. Kilimanjaro are designated as lectotype and paralectotype. Lehtinen (1967: 259) suggested that *Haemilla tanganensis* Simon and Fage 1922 was a junior synonym of this species. Examination of the internal genitalia of the types of *P. tanganensis* and *P. nebulosum* revealed these to be distinct; therefore the synonymy proposed by Lehtinen is rejected.

DIAGNOSIS: Female with epigynum as in

figure 94a, PML width less than 3 times length, posterior margin straight to slightly curved; spermathecae as in figures 93e and 94c, with copulatory ducts long, extending dorsally to anterior margin of spermathecae, anterior lobes of spermathecae bulbous, and distinguished from *P. irwini* by having the anteromedian bulbs stout and the simple posterior lobes transverse.

FEMALE (Mt. Kilimanjaro): Total length 4.67. Carapace dark yellow-brown; pars thoracica dusky along margin and with anterolateral, lateral, and posterolateral radii extending from thoracic fovea; pars cephalica with broad, dusky, v-shaped mark anteriad of thoracic fovea, extending anteriorly as reticulate lines to posterior eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown; labium and palpal coxa dark red-brown, lighter at tips; sternum dusky brown; coxae and trochanters yellow-brown with longitudinal dusky maculations; legs yellow-brown, with lateral longitudinal dusky maculations on femur II and femora to tibiae of leg I and palpus, femora III and IV with median and subapical dusky annuli, patellae II–IV with apical annuli, and tibiae and metatarsi II–IV with median and apical annuli; abdomen dark gray, dorsum with light cardiac spot, 2 pairs of small median spots, and 2 faint posterior chevrons, venter with pair of narrow, broken longitudinal bands. Carapace 2.08 long, 1.60 wide; thoracic fovea broad, shallow, 0.13 carapace length; clypeus 0.17 high; ocular area 0.23 long, 0.66 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.43:1.43:1.71, diameter of PM 0.10; AM separated by their diameter, separated from AL by 1¼ AM; PM separated by 1⅓ their diameter, separated from PL by 1⅛ PM. Chelicerae 0.84 long, smooth, promargin of fang furrow with 6, retromargin with 3 large and 2 small teeth. Sternum 1.20 long, 1.04 wide, margin nearly entire, apex weakly pointed; labium 0.38 long, 0.40 wide; palpal coxa 0.68 long, 0.44 wide. Femur I length 1.30 times carapace width. Spination: palpus: femur d0-0-1, tibia p1-0-1, tarsus p1-2-2, v0-1-2-1, r0-1-1-0; leg I: femur d0-1-0-0, p0-1-0-1, metatarsus p0-0-0-1, v2-2-0-1, r0-0-0-1; leg II: femur d0-1-0-0, p0-0-0-1, tibia p0-1-1-0, v0-1-0-0, r0-1-1-0, metatarsus p0-1-0-2, v2-2-0-1, r0-1-0-2; leg III: femur d0-1-0-0, p0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p1-1-1-2, v2-1-1, r1-1-0-2; leg IV: femur d1-1-0-0, tibia p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p1-1-0-2, v1-1-1, r1-0-0-1. Palpal femur with row of 3 short, slender anterobasal setae with swollen bases, no true thorns. Calamistrum origin at 0.50 from metatarsus base, length 0.44 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.08	1.75	1.46	1.92	0.71
Patella	0.75	0.67	0.67	0.75	0.38
Tibia	1.83	1.25	1.08	1.58	0.46
Metatarsus	1.75	1.25	1.08	1.50	—
Tarsus	1.00	0.92	0.75	0.83	0.92
Total	7.41	5.84	5.04	6.58	2.47

Epigynum as in figure 94a, LTR recurved, copulatory openings hidden, PML oval, width 2.80 times length, posterior margin straight; spermathecae as in figure 94c, with copulatory ducts long, extending dorsally to anterior margin of spermathecae, anterior lobe of each spermatheca bulbous, median, containing spherical afferent chamber, with anterolateral convoluted median chamber, and transverse posterior lobe containing simple efferent chamber (fig. 93e).

MALE: Unknown.

DISTRIBUTION: Known only from the type locality at Mt. Kilimanjaro, Tanzania (fig. 113).

MATERIAL EXAMINED: TANZANIA: *Kilimanjaro*: Mt. Kilimanjaro, Kibonoto (*Amphigyrum nebulosum* Tullgren, syntypes) (Y. Sjöstedt, NRS), 2♀; Mt. Kilimanjaro, 1912 (C. Alluaud & R. Jeannel, MNHN), 3♀.

Phyxelida irwini, new species

Figures 93d, 94b, d, 113

TYPE: Holotype female from the crest of the escarpment, 22 mi N of Nairobi, Central Province, Kenya (Nov. 21, 1969; M. E. Irwin & E. S Ross), deposited in CAS.

ETYMOLOGY: The specific name is a patronym in honor of one of the collectors of the holotype.

DIAGNOSIS: Female with epigynum as in figure 94b, PML width less than 3 times length, posterior margin convex; spermathe-

cae as in figure 94d, with copulatory ducts long, extending dorsally to anterior margin of spermathecae, anterior lobes of spermathecae bulbous, and distinguished from *P. nebulosa* by having the anteromedian bulbs slender and the convoluted posterior lobes oblique to longitudinal (fig. 93d).

FEMALE (holotype): Total length 8.38. Carapace orange-brown, pars cephalica with faint, dusky, v-shaped mark anteriad of thoracic fovea, darkened along margin of clypeus; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, unmarked except sternum and coxae with dusky maculations; abdomen gray-brown, dorsum and sides unmarked, venter with pair of narrow, broken, longitudinal light bands, between these gray-brown, unmarked. Carapace 3.66 long, 2.97 wide; thoracic fovea deep, wide, short, narrowed posteriorly, length 0.12 carapace; clypeus 0.32 high; ocular area 0.42 long, 1.14 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.42:1.25:1.50, diameter of PM 0.16; AM separated by 4/5 their diameter, separated from AL by 5/6 AM; PM separated by 1 1/6 their diameter, separated from PL by 1 1/3 AM; lateral eyes separated by 1/4 PL diameter. Chelicerae 1.70 long, robust, smooth, promargin of fang furrow with 5 large and 1 minute, retromargin with 4 large and 2 minute teeth. Sternum 1.38 long, 1.22 wide, broad anteriorly, margin sinuate, apex pointed; labium 0.47 long, 0.52 wide; palpal coxa 0.86 long, 0.50 wide. Femur I length 1.31 times carapace width. Spination: palpus: femur d0-0-0-1, patella d0-0-1, tibia p0-1-1-0, tarsus p2-1-1, v0-0-1-2-2-3-2; leg I: femur d0-1-0-0, p0-0-1-1, tibia p0-0-0-1, metatarsus v2-2-0-1; leg II: femur d0-1-0-0, p0-0-1-1, r0-1-0-0, tibia p0-1-1-0, v0-1-0-1, r0-0-1-0, metatarsus p0-1-0-2, v2-2-0-1, r0-0-0-1; leg III: femur d1-1-0-0, p0-1-0-1, r0-0-0-1, tibia d1-0-0-0, p1-1-1-0, v1-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia p0-1-1-0, v1-0-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-0-0-2. Palpal femur with basal group of 3 or 4 setae and row of 2 minute anterobasal thorns. Calamistrum origin at 0.46 from metatarsus base, length 0.40 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.63	2.31	2.06	2.63	0.88
Patella	1.00	0.94	0.81	1.00	0.38
Tibia	2.25	1.81	1.47	2.13	0.50
Metatarsus	2.38	1.81	1.69	2.19	—
Tarsus	1.25	1.00	0.94	1.06	1.00
Total	9.51	7.87	6.97	9.01	2.76

Epigynum as in figure 94b, LTR recurved, partially hidden beneath lateral lobes of PML, copulatory openings visible medially, PML oval, width 2.75 times length, posterior margin convex, angled laterally; spermathecae as in figure 94d, with copulatory ducts long, extending dorsally to anterior margin of spermathecae, anteromedian lobe of each spermatheca bulbous, narrow, containing slender afferent chamber, posterior lobe convoluted, oblique to longitudinal, containing convoluted efferent chamber (fig. 93d).

MALE: Unknown.

DISTRIBUTION: Known only from the type locality in the uplands of Central Province, Kenya (fig. 113).

Phyxelida umlima, new species
Figures 93b, 95c, d, 113

TYPES: Holotype female from south slope of Mt. Hanang (4°26'S; 35°24'E), elev. 2000 m, Arusha Province, Tanzania (28 May 1957; P. Basilewsky & N. Leleup), deposited in MRAC. Paratype female, same data.

ETYMOLOGY: The specific name is from *mlima*, a Swahili word for mountain.

DIAGNOSIS: Female with epigynum as in figure 95c, PML width about twice length; spermathecae as in figures 93b and 95d, copulatory ducts long, extending dorsally to anterior margin of spermathecae, anterior lobes of spermathecae trapezoidal, and distinguished from those of *P. crassibursa* by having the copulatory ducts slender and the anterior lobes of the spermathecae simple.

FEMALE (holotype): Total length 4.33. Carapace yellow-gray, pars thoracica dark along margin and with dusky lateral reticulations and anterolateral, lateral, and posterolateral radii; pars cephalica with broad, dusky, v-shaped mark anteriad of thoracic fovea extending anteriorly as reticulations to poste-

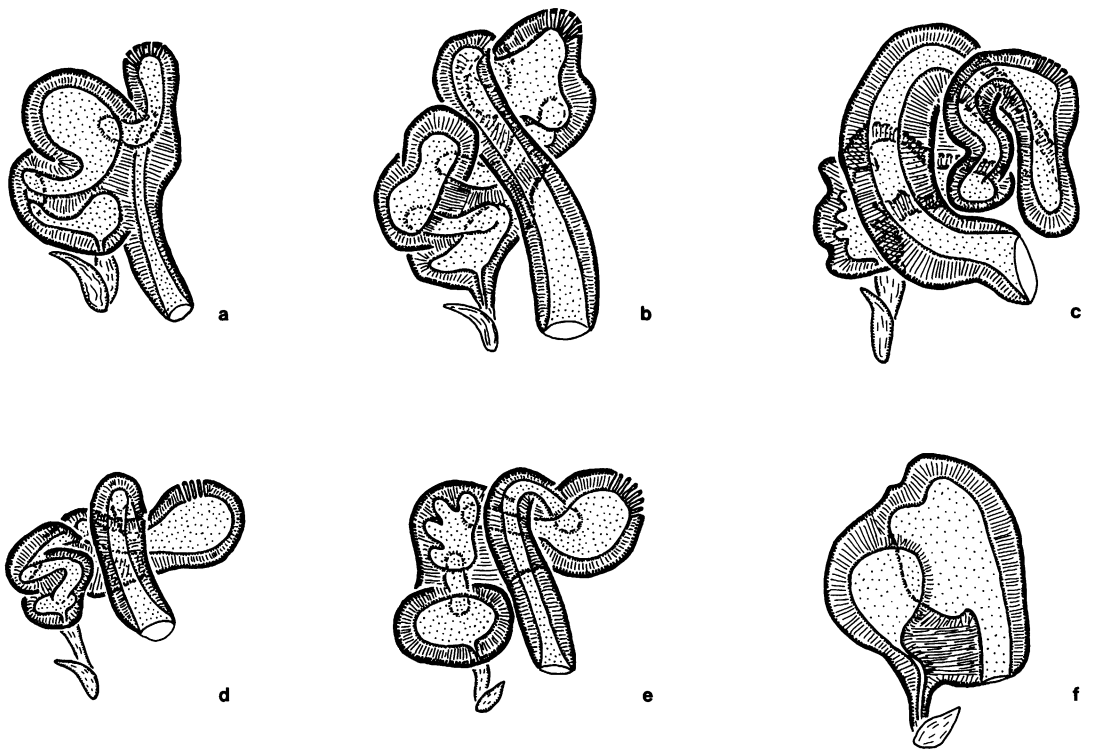

Fig. 93. Left spermathecae of Phyxelidini, cleared, dorsal views. a–e. *Phyxelida* spp. **a.** *jabalina*, new species, paratype. **b.** *umlima*, new species, paratype. **c.** *crassibursa*, new species, Kitale. **d.** *irwini*, new species, holotype. **e.** *nebulosa* (Tullgren), Kilimanjaro. **f.** Phyxelidini incertae sedis, Grootvadersbosch.

rior eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown, boss yellow-white; labium and palpal coxa orange-brown, lighter at tips; sternum dusky; coxae yellow-white with dusky maculations; trochanters, legs, and palpi yellow-white. Legs, especially II–IV, annulate: femora with median and subapical, patellae with apical, and tibiae with median and apical annuli. Abdomen gray-brown, dorsum light anteriorly, with median paired light spots becoming chevrons posteriorly, sides mottled with light and dark, venter with pair of broad longitudinal light bands, area between these gray-brown with large light mark. Carapace 2.08 long, 1.48 wide, margin entire; thoracic fovea broad, shallow, length 0.13 carapace; clypeus 0.18 high; ocular area 0.26 long, 0.66 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.25:1.13:1.25, diameter of PM 0.09; AM separated by ⅔ their diameter, separated from AL by ¾ AM; PM separated by 1¼ their diameter, separated from PL by 1⅓ PM. Chelicerae 0.90 long, smooth, promargin of fang furrow with 6, retromargin with 6 (4 + 2) teeth. Sternum 1.12 long, 0.96 wide, margin nearly entire, apex a right angle; labium 0.32 long, 0.40 wide; palpal coxa 0.62 long, 0.40 wide. Femur I length 1.57 times carapace width. Spination: palpus: femur d0-0-1, patella d1-0-1, tibia p1-0-1, tarsus p2-2-1, v0-0-2-1-1-2, r0-2-0; leg I: femur d0-0-1-0, p0-0-1-0, tibia p0-1-1-0, r0-0-1-0, metatarsus p0-0-0-1, v2-1-1, r0-0-0-1; leg II: femur d0-0-1-0, r0-0-1-0, tibia p0-1-1-0, r0-1-1-0, metatarsus p0-1-0-2, v2-1-1, r0-0-0-2; leg III: femur d0-1-0-0, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-0-1, r1-0-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-1-1-1-1, r1-0-0-1. Palpal femur with

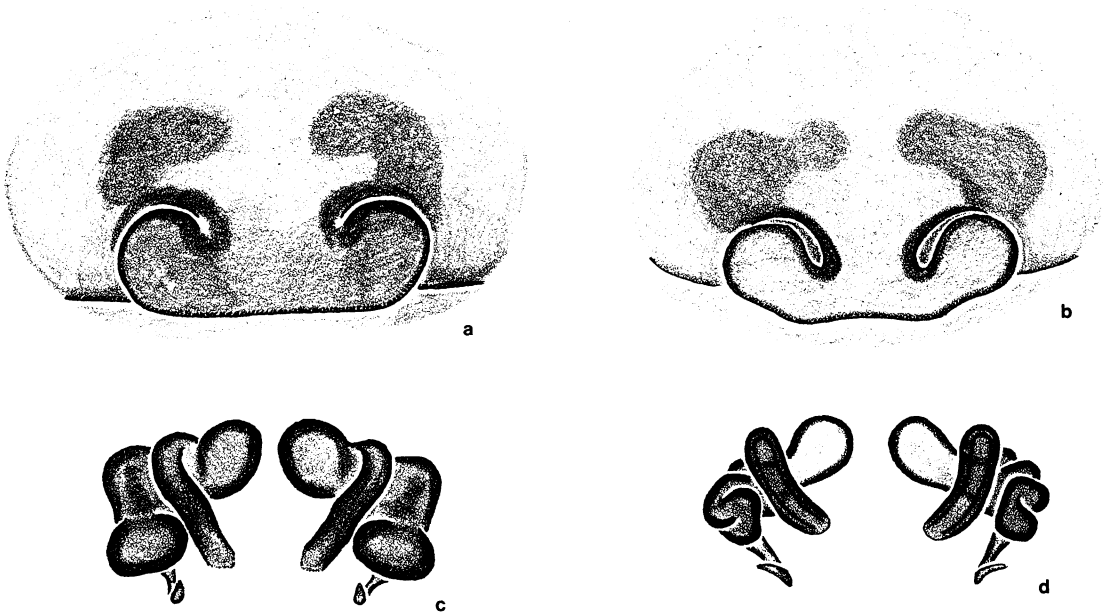

Fig. 94. *Phyxelida* spp., female genitalia. a, c. *nebulosa* (Tullgren), Kilimanjaro. b, d. *irwini*, new species, holotype. **a, b.** Epigyna, ventral. **c, d.** Spermathecae, dorsal.

row of 3 slender, shortened anterobasal setae. Calamistrum origin at 0.45 from metatarsus base, length 0.38 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.33	1.92	1.67	2.17	0.83
Patella	0.75	0.71	0.67	0.75	0.38
Tibia	2.08	1.50	1.25	1.75	0.50
Metatarsus	2.00	1.50	1.33	1.75	—
Tarsus	1.00	0.92	0.83	0.83	0.83
Total	8.16	6.55	5.75	7.25	2.54

Epigynum as in figure 95c, LTR recurved, copulatory openings hidden, PML oval, sides recurved, width 2.13 times length, narrowed posteriorly, posterior margin strongly procurved; spermathecae as in figure 95d, copulatory ducts long, slender, extending dorsally to anterior margin of spermathecae, each leading to large afferent chamber, anterior lobe of each spermatheca trapezoidal, simple, posterolateral lobe containing small, spiraled efferent chamber (fig. 93b).

MALE: Unknown.

DISTRIBUTION: Known only from the type locality at Mt. Hanang, Tanzania (fig. 113).

Phyxelida crassibursa, new species
Figures 93c, 95e, f, 113

TYPE: Holotype female from 38 mi SE of Kitale, Rift Valley Province, Kenya, elev. 2100 m (Oct. 14, 1957; E. S. Ross & R. E. Leech), deposited in CAS.

ETYMOLOGY: The specific name is from the Latin *crassus*, thick, and *bursa*, purse, referring to the thickened spermathecal afferent duct.

DIAGNOSIS: Female with epigynum as in figure 95e, PML width less than 3 times length, posterior margin convex, straight medially; spermathecae as in figure 95f, with copulatory ducts long, extending dorsally to anterior margin of spermathecae, anterior lobes of spermathecae broad, convoluted, and distinguished from those of *P. umlima* by having the copulatory ducts broad and the anterior lobes of the spermathecae complex, with straight median and sinuate lateral convolutions (fig. 93c).

FEMALE (holotype): Total length 5.88. Carapace orange-brown, pars thoracica dusky along margin and with short anteromedian

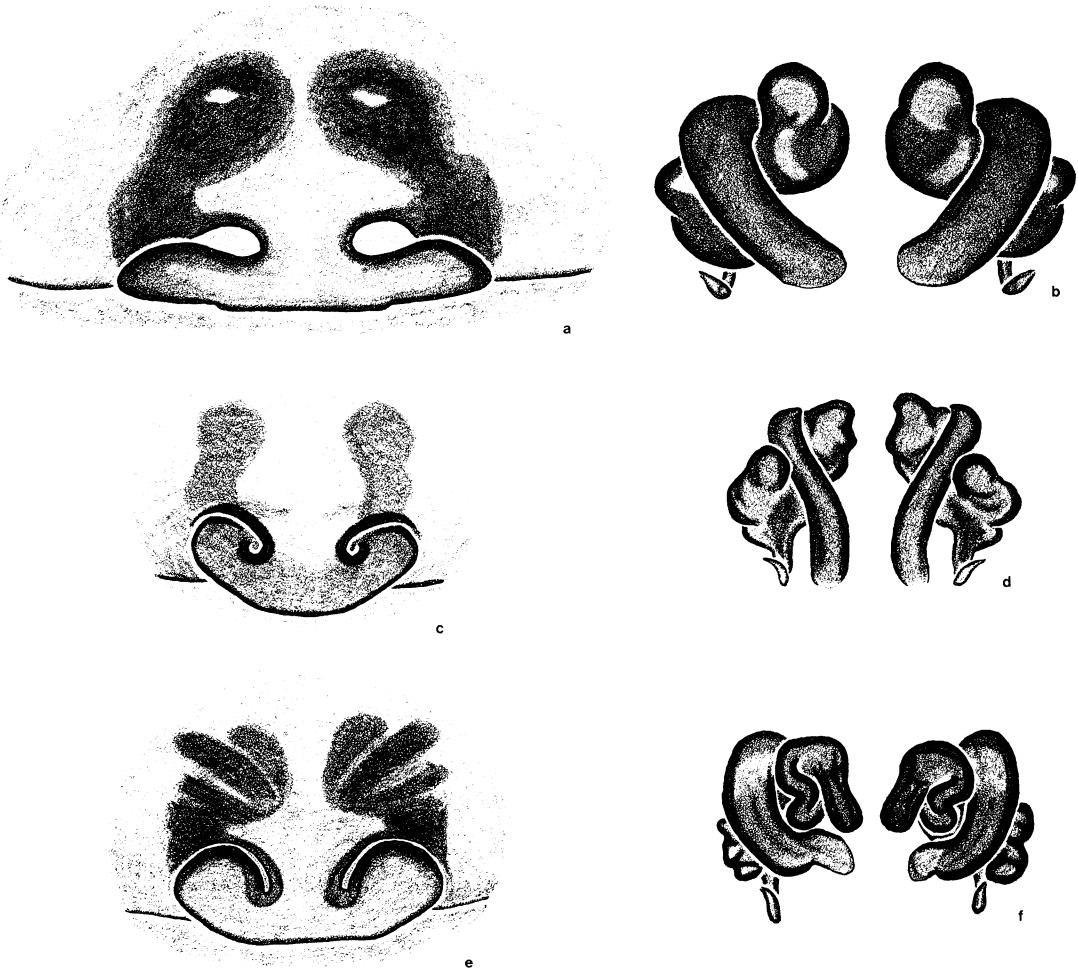

Fig. 95. *Phyxelida* spp., female genitalia. a, b. *eurygyna*, new species, holotype. c, d. *umlima*, new species, holotype. e, f. *crassibursa*, new species, Kitale. **a, c, e.** Epigyna, ventral. **b, d, f.** Spermathecae, dorsal.

and median dusky radii, pars cephalica with broad, dusky, v-shaped mark anteriad of thoracic fovea and longitudinal lines on each side extending anteriorly to posterior eyes; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae red-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, sternum and coxae with dusky maculations. Posterior legs annulate: patellae with apical, femora, tibiae, and metatarsi with median and apical. Abdomen gray-brown, dorsum with 6 or 7 pairs of light spots, venter with pair of broad longitudinal light bands, connected transversely in center. Carapace 2.69 long, 2.00 wide; thoracic fovea wide, deep, narrowed posteriorly, length 0.12 carapace; clypeus 0.21 high; ocular area 0.30 long, 0.83 wide, PER slightly procurved; ratio of eyes AM:AL:PM:PL, 1.00:1.14:1.00:1.21, diameter of PM 0.11; AM separated by ½ their diameter, separated from AL by ¾ AM; PM separated by 1⅔ their diameter, separated from PL by 1⅔ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.14 long, robust, with weak ventral wrinkles, promargin of fang furrow with 5 teeth, retromargin with

5 large teeth and 1 minute tooth. Sternum 1.38 long, 1.22 wide, broad anteriorly, sides sinuate, apex pointed; labium 0.47 long, 0.50 wide; palpal coxa 0.78 long, 0.47 wide. Femur I length 1.44 times carapace width. Spination: palpus: femur d0-0-1, patella d1-0-1, tibia p0-1-1-0, tarsus p2-2-1, v0-0-2-2-3-2, r1-1-0; leg I: femur d0-1-0-0, p0-0-1-1, tibia p0-1-1-0, r0-0-1-0, metatarsus p0-0-0-1, v2-2-1, r0-0-0-1; leg II: femur d0-1-0-0, p0-0-0-1, tibia p0-1-1-0, v0-0-1-1, r0-1-1-0, metatarsus p0-1-0-2, v2-2-0-1, r0-1-0-1; leg III: femur d1-1-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-1-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-1-0-0, tibia p0-1-1-0, v1-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-0-0-2. Palpal femur with row of 2 short, slender anterobasal thorns, bases enlarged. Calamistrum origin at 0.42 from metatarsus base, length 0.42 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.88	2.44	2.13	2.63	0.88
Patella	1.00	0.94	0.81	0.94	0.44
Tibia	2.50	1.88	1.69	2.25	0.56
Metatarsus	2.50	1.94	2.31	2.25	—
Tarsus	1.31	1.13	1.00	1.13	1.19
Total	10.19	8.33	7.94	9.20	3.07

Epigynum as in figure 95e, LTR strongly recurved, copulatory openings visible mesally as narrow slits, PML oval, width 2.71 times length, sides strongly curved, narrowed posteriorly, margin straight medially; spermathecae as in figure 95f, with copulatory ducts long, very broad, extending dorsally to anterior margin of spermathecae, anterior lobe of each spermatheca broad, with straight median and sinuate lateral convolutions, and with posteroventral lobe containing convoluted efferent chamber (fig. 93c).

VARIATION: Total length 5.75–5.88; thoracic fovea 0.12–0.15 length carapace; PER width 1.17–1.21 times AER, 2.74–2.94 times OAL; OQP 1.26–1.32 times OQA, 1.25–1.33 times OQL; cheliceral length 5.29–5.69 times clypeal height; labium length 0.82–0.94 times width. Leg markings distinct to obscure; femur I length 1.31–1.50 times carapace width.

MALE: Unknown.

DISTRIBUTION: Highlands near Mt. Elgon in west-central Kenya (fig. 113).

ADDITIONAL MATERIAL EXAMINED: KENYA: *Rift Valley*: Kitale, toward Mt. Elgon, Aug. 20, 1972, elev. 7000 ft (J. &. F. Murphy, JMC), 2♀.

Phyxelida eurygyna, new species

Figures 95a, b, 113

TYPE: Holotype female from 2100 m elevation in the Manyanjere Forest, Nyika Plateau (10°40′S; 33°50′E), Northern Province, Malawi (Dec. 16, 1981; R. Jocqué), deposited in the MRAC.

ETYMOLOGY: The specific name is from the Greek *eurys* and *gyne* referring to the very broad epigynal plate.

DIAGNOSIS: Female with epigynum as in figure 95a, PML very broad, width greater than 4 times length; spermathecae as in figure 95b, with copulatory ducts long, broad, extending dorsally to anterior margin of spermathecae, anterior lobes bulbous.

FEMALE (holotype): Total length 8.25. Carapace dusky brown, pars thoracica dark along margin, with anterolateral, median, and posterolateral dark radii; pars cephalica with broad, v-shaped dusky mark anteriad of thoracic fovea, extending anteriad as median lateral lines to PM and PL; ocular area dark red-brown, black pigment surrounding eyes and extending between AM and between AL-PL; chelicerae red-brown, boss yellow-brown; sternum brown, labium and palpal coxa dark red-brown, lighter at tips; palpi and legs dusky yellow-brown, shading to orange-brown distally, tibiae III and IV with faint apical annuli; abdomen dark gray with anterodorsal light longitudinal cardiac mark, chevrons absent, venter with pair of thin, irregular longitudinal light bands, area between these gray-brown. Carapace 3.28 long, 2.47 wide; thoracic fovea broad, length 0.10 carapace; clypeus 0.29 high; ocular area 0.34 long, 0.96 wide; ratio of eyes AM:AL:PM:PL, 1.06:1.13:1.00:1.57, diameter of PM 0.13; AM separated by ½ their diameter, separated from AL by nearly AM diameter; PM separated by 1¼ their diameter, separated from PL by 1¼ PM; lateral eyes separated by ⅓ PL diameter. Chelicerae 1.38 long, robust, smooth, promargin of fang furrow with 6, retromargin with 4 large and 2 minute teeth. Sternum 1.68 long, 1.34 wide, base weakly narrowed, sides sinuate, apex pointed; labium 0.55 long, 0.63

wide; palpal coxa 1.00 long, 0.59 wide. Femur I length 1.70 times carapace width. Spination: palpus: femur d0-0-0-1, patella d1-0-1, tibia p0-1-1-0, tarsus p2-1-1, v0-0-1-2-2-3-2-1-1, r1-0-0; leg I: femur d0-0-1-0, p0-0-1-1, tibia p0-1-1-0, r0-1-1-0, metatarsus p0-0-0-1, v2-0-2-1, r1-0-0-1; leg II: femur d0-0-1-0, p0-0-1-1, r0-0-1-0, tibia p0-1-1-0, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-1; leg III: femur d0-1-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d0-1-0-1, p0-1-1-0, v0-0-0-1, r1-1-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p1-1-2, v2-0-1-1, r1-0-0-1. Palpal femur with row of 5 anterobasal setae, distal 2 thickened as small thorns. Calamistrum origin at 0.41 from metatarsus base, length 0.35 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.09	1.66	1.47	1.84	0.59
Patella	0.69	0.56	0.50	0.63	0.28
Tibia	1.78	1.34	1.09	1.53	0.38
Metatarsus	1.88	1.34	1.19	1.59	–
Tarsus	0.88	0.75	0.69	0.78	0.66
Total	7.32	5.65	4.94	6.37	1.91

Epigynum as in figure 95a, LTR greatly recurved, hidden laterally beneath PML, copulatory openings exposed medially, PML trapezoidal, very broad, width 5.30 times length, sides sharply curved, broadest posteriorly; spermathecae as in figure 95b, with copulatory ducts long, broad, extending dorsally to anterior margin of spermathecae, each with anterior lobe bulbous, containing small afferent chamber, with posteroventral lobe containing simple efferent chamber.

MALE: Unknown.

DISTRIBUTION: Known only from the type locality in the highlands of northern Malawi (fig. 113).

Phyxelida bifoveata (Strand)

Figures 91e, 96a–c, 97a, b, 99a, b, 112

Amphigyriodes bifoveata Strand, 1913: 327 (female holotype from the Rugege Forest, Rwanda, ZMB, examined). – Roewer, 1954: 1360.

Amphigyriodes bifoveatum: Bonnet, 1955: 299 (amended to agree with neuter generic name).

Phyxelida bifoveata: Lehtinen, 1967: 259.

DIAGNOSIS: Male palpal bulb (fig. 96a, c) with embolus broad, flattened, apex recurved; chelicerae smooth; metatarsus I (fig. 97a, b) strongly curved laterally and dorsoventrally distad of retrolateral clasping spine. Female with epigynum as in figure 99a, PML broad, width greater than twice length; spermathecae as in figures 91e and 99b, copulatory ducts short, posterior, anterior margin of spermathecae with slender dorsomedian and broadly conical ventrolateral lobes, and distinguished from *P. tanganensis* in that the spermathecae are approximate, with the distance between less than ¼ their length, and spermatheca each lacking a well-defined posterior lobe.

MALE (Uzungwa Mountains): Total length 5.81. Carapace pale yellow-brown, pars thoracica dusky along margin, dusky markings forming anterolateral, median, and posterolateral radii; pars cephalica with narrow, dusky, v-shaped mark anteriad of thoracic fovea becoming dusky longitudinal lines in center and 2 on each side which extend anteriorly to PER; ocular area dusky, black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae, labium, and palpal coxa yellow-brown, apex of labium yellow-white; sternum, coxae, trochanters, legs, and palpi pale yellow-brown, sternum, coxae, and trochanters dusky; metatarsus-tarsus I orange-brown, tibiae III and IV with faint apical annuli; abdomen dark gray mottled with white, dorsum with anterior diffuse light area and 3 light posteromedian chevrons, venter with pair of thin, irregular longitudinal light bands, area between these gray-brown. Carapace 3.25 long, 2.50 wide; thoracic fovea long, narrowed posteriorly, length 0.25 carapace; clypeus 0.22 high; ocular area 0.34 long, 0.83 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.06:1.00:1.18, diameter of PM 0.14; AM separated by ½ their diameter, separated from AL by ⅗ AM; PM separated by ⅘ their diameter, separated from PL by almost PM diameter; lateral eyes nearly contiguous. Chelicerae 1.20 long, slender, sides slightly concave, smooth, promargin of fang furrow with 3 small and 3 large, retromargin with 4 large and 3 minute teeth. Sternum 1.72 long, 1.50 wide, weakly narrowed anteriorly, margin sinuate, apex pointed; labium 0.55 long, 0.53 wide; palpal coxa

0.94 long, 0.50 wide. Legs elongate, femur I length 2.30 times carapace width; metatarsus I (fig. 97a, b) broad for basal ⅙, narrowed with strong kink at this point forming short retrolateral process surmounted by stout, curved clasping spine and spinule-lined concavity, concavity with basal mound covered with stiff setae, distad of this segment slender and medially sinuate laterally and dorsoventrally; legs otherwise unmodified. Spination: palpus: femur d1-1-1-1-1, p0-0-0-1-0; leg I: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v2-1-0-2, r0-1-1, metatarsus p0-1-0-1, v2-1-1-1, r0-1-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v2-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg III: femur d1-1-0-0, p0-1-1-1, r0-1-0-1, tibia d1-0-0-0, p0-1-1-0, v2-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-2-1, r1-1-0-2; leg IV: femur d2-0-2-0, p0-1-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-1-1, r1-0-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	5.75	4.75	3.94	4.94	1.56
Patella	1.38	1.19	1.13	1.19	0.44
Tibia	5.06	4.13	3.13	4.50	0.69
Metatarsus	5.63	4.50	3.75	5.19	—
Tarsus	2.00	1.63	1.38	1.75	1.06
Total	19.82	16.20	13.33	17.57	3.75

Palpal femur with basal group of slender anterobasal setae leading into row of 3 or 4 setae with enlarged bases, distal stoutest; tibia (fig. 96b) with DA process very short, truncate, D process long, bladelike, directed retrolaterad; palpal bulb (fig. 96a, c) with MA originating retroapically on tegulum, directed proximad, cylindrical, tapering to tip; embolus and lamellar pars pendula short, origins proapical, embolus broad, flattened, with weak apicomedian ridge, apex bent proximad; apical portion of conductor complex, with subapical distad-directed flange, apex twisted ventrad.

VARIATION: Total length 5.81–7.08; carapace length 1.24–1.30 times length; thoracic fovea 0.17–0.25 length of carapace; PER width 1.08–1.21 times AER, 2.48–2.52 times OAL; OQP 1.25–1.29 times OQA, 1.05–1.19 times OQL; cheliceral length 4.93–5.36 times clypeal height; sternum length 1.15–1.18 times width; labium length 1.03–1.07 times width.

FEMALE (Musvenene-Kyondo Forest): Total length 8.88. Carapace orange-brown, chelicerae red-brown, boss yellow-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, and trochanters yellow-brown, with faint dusky markings; legs yellow-brown, palpal tarsus and metatarsi–tarsi I and II shading to orange-brown, unmarked except tibiae III and IV with very faint median and apical dusky radii; abdomen dark gray, mottled with white, dorsum with diffuse light anterodorsal markings and 4 light median and posterior chevrons, venter with pair of narrow light longitudinal bands, area between these with 2 or 3 pairs of light spots. Carapace 3.88 long, 2.16 wide; thoracic fovea broad, deep, narrowed posteriorly, length 0.18 carapace; clypeus 0.32 high; ocular area 0.42 long, 1.23 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.30:1.10:1.30, diameter of PM 0.18; AM separated by ⅘ their diameter, separated from AL by AM diameter; PM separated by 1⅓ their diameter, separated from PL by 1½ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.68 long, robust, with weak oblique ventral wrinkles, promargin of fang furrow with 5 large and 2 minute, retromargin with 6 teeth. Sternum 2.00 long, 1.63 wide, broad anteriorly, margin sinuate, apex pointed; labium 0.75 long, 0.69 wide; palpal coxa 1.22 long, 0.72 wide. Femur I length 1.69 times carapace width. Spination: palpus: femur d0-0-0-1, p0-0-0-1, tibia p0-1-1-0, tarsus p1-0-1-1, v1-0-2-1-2-2-1, r1-0-1-0; leg I: femur d1-0-0-0, p0-0-1-1, r0-0-0-1, tibia p0-1-1-0, v0-2-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-0-2-1, r0-1-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-1-0-1, tibia p0-1-1-0, v0-1-0-1, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r0-1-0-2; leg III: femur d1-0-1-0, p0-1-0-1, r0-1-0-1, tibia d1-0-0-0, p0-1-1-0, v2-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-1-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v1-0-0-2, r0-1-1-0, metatarsus p1-0-1-2, v2-1-0-1, r1-0-0-2. Palpal femur with 2 anterobasal rows of slender setae. Calamistrum origin at 0.47 from metatarsus base, length 0.33 that of segment. Leg measurements:

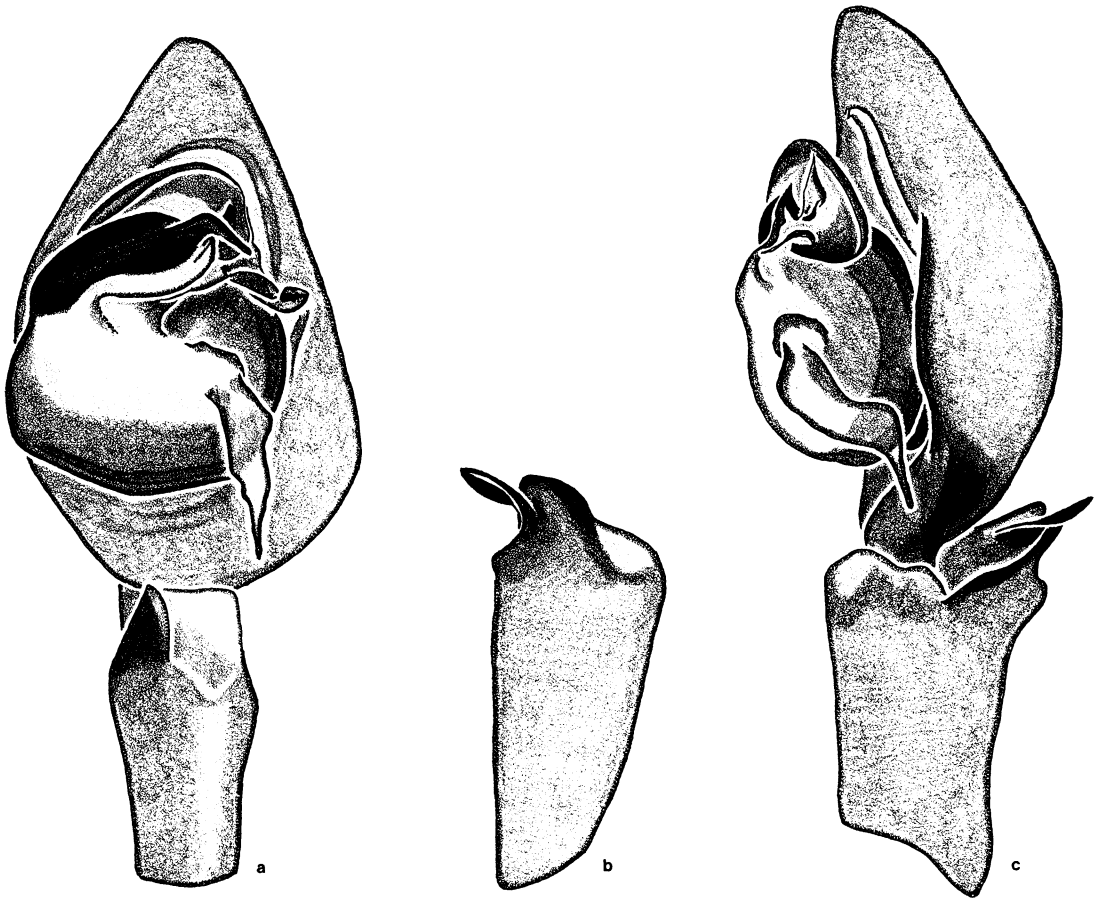

Fig. 96. *Phyxelida bifoveata* (Strand), Uzungwa Mts., male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral.

	I	II	III	IV	Palp
Femur	4.75	3.94	3.43	4.19	1.88
Patella	1.50	1.44	1.31	1.44	0.69
Tibia	4.44	3.25	2.62	3.75	1.00
Metatarsus	4.38	3.38	2.94	3.75	—
Tarsus	1.88	1.63	1.44	1.63	1.69
Total	16.95	13.64	11.74	14.76	5.26

Epigynum as in figure 99a, LTR recurved, copulatory openings hidden, epigynal plate with paired anterior depressions and paired median transverse ridges; PML broad, width about 3 times length, oval, gently procurved posteriorly; spermathecae as in figure 99b, approximate, distance between less than ⅛ length, each with copulatory duct short, posterior, leading into slender ventral afferent chamber, anterior margin of spermatheca with slender dorsomedian and broadly conical ventrolateral lobes, dorsomedian afferent chamber leading to small posterolateral chamber, and lacking a well-defined posterior lobe (fig. 91e).

VARIATION: Total length 6.31–9.25; carapace length 1.30–1.38 times width, markings distinct to obscure, prefoveal v- or w-shaped mark present or absent; thoracic fovea 0.13–0.18 length carapace; PER width 1.13–1.21 times AER, 2.86–3.24 times OAL; OQP 1.28–1.44 times OQA, 1.33–1.50 times OQL; cheliceral length 4.87–6.00 times clypeal height, promargin of fang furrow with 6 or 7, retromargin with 5–8 teeth; sternum length 1.18–1.23 times width, margin sinuate to nearly entire; labium length 0.95–1.09 times width;

legs uniformly marked or weakly annulate, especially posteriorly, femur I length 1.63–1.69 times carapace width; palpal femur with narrowly triangular group or 1 or 2 rows of slender anterobasal setae, distal setae may arise from enlarged bases; abdomen with ventral longitudinal light bands broad and broken or entire; epigynum with posterior margin gently curved to weakly produced medially; spermathecae with dorsomedian lobes straight or recurved, distance between spermathecae 0.11–0.20 length.

NATURAL HISTORY: All label data suggest that this species occurs in moist montane forests.

DISTRIBUTION: Highlands of central East Africa (fig. 112).

MATERIAL EXAMINED: KENYA: *Eastern*: Mt. Kenya, Firimon Track, Aug. 3, 1975, elev. 2640 m, litiere de bambou (J. Van Goethem, MRAC), 1♀; Naro Meru, near Mt. Kenya, Aug. 17, 1974, elev. 8000 ft (J. &. F. Murphy, JMC), 1♀. RWANDA: South West, Rugage Wald, (02°30′S; 29°15′E), Aug. 20, 1907, elev. 1800 m (Hertzog, Adolf Friedrich z. Mecklenburg, ZMB), 1♀ (*Amphigyriodes bifoveata* Strand, holotype). TANZANIA: *Tanga*: West Usambara Mountains, Mazumbai (4°48′S; 38°30′E), Aug. 1, 1980, elev. 1600 m (M. Stoltze & N. Scharff, ZMC), 2♀. *Mbeya*: Mwanihana Forest (7°50′S; 36°50′E), Uzungwa Mountains above Sanje, Aug. 18, 1982, 1800 m (M. Stoltze & N. Scharff, ZMC), 1♂. ZAIRE: *Kivu*: Musvenene-Kyondo Forest, Apr. 10, 1976, sol suspendu mélangé de mousse (R. P. M. Lejeune, MRAC), 2♀; Kivu, Butembo-vallee, Musosa, April 1968, elev. 1745 m (R. P. M. Lejeune, MRAC), 1♂, 1♀; Kivu, Mt. Lubwe, SE of Butembo, April 13, 1971, elev. 2380 m (R. P. M. Lejeune, MRAC), 4♀.

Phyxelida tanganensis (Simon & Fage), new combination

Figures 91f, 97c, d, 98a–e, 112

Haemilla tanganensis Simon and Fage, 1922: 526 (lectotype male and paralectotype female, here designated, from the Kulumuzi Cave, Tanzania, MNHN, examined). – Roewer, 1954: 1367. – Bonnet, 1957: 2071.

Phyxelida nebulosa: Lehtinen, 1967: 259 (misidentification, not *nebulosum* Tullgren, 1910).

NOTE: The name *tanganensis* Simon and Fage was synonymized with *Amphigyrum nebulosum* Tullgren by Lehtinen (1967: 259). Examination of the internal genitalia of the types of *H. tanganensis* and *A. nebulosum* revealed these to be distinct; therefore the synonymy proposed by Lehtinen is rejected.

DIAGNOSIS: Male palpal bulb (fig. 98a, c) with embolus slender, spinelike, apex of conductor strongly sinuate, MA long, directed proximad, tapering to apex; chelicerae smooth; metatarsus I (fig. 97c, d) strongly curved laterally and dorsoventrally distad of retrolateral clasping spine; palpal tibia (fig. 98b) with D process much longer than DA. Female with epigynum as in figure 98d, PML broad, width greater than twice length; spermathecae as in figures 91f and 98e, copulatory ducts short, posterior, anterior margin of each spermatheca with slender dorsomedian and conical ventrolateral lobes, and distinguished from *P. bifoveata* in having the spermathecae widely separated, with the distance between at least ⅔ their length, and having well-defined posterodorsal lobes.

MALE (lectotype): Total length 6.42. Specimen faded, carapace yellow-brown, unmarked except for sclerotized radii along margin of pars cephalica anterolaterally, laterally, and posterolaterally; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae, labium, and palpal coxa yellow-brown, sternum, coxae, trochanters, legs and palpi yellow-white, metatarsus I sclerotized red-brown; abdomen pale gray, markings obscure. Carapace 3.20 long, 2.60 wide; thoracic fovea broad, deep, narrowed posteriorly, length 0.21 carapace; clypeus 0.24 high; ocular area 0.34 long, 0.90 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.25:1.33:1.50, diameter of PM 0.16; AM separated by ¼ their diameter, separated from AL by ½ AM; PM separated by ⅘ their diameter, separated from PL by 1⅛ PM; lateral eyes nearly contiguous. Chelicerae 1.08 long, smooth, slender, promargin of fang furrow with 7, retromargin with 2 large and 4 minute teeth. Sternum 1.68 long, 1.56 wide, margin sinuate, apex pointed; labium 0.56 long, 0.56 wide; palpal coxa 1.00 long, 0.52 wide. Legs elongate, femur I length 2.69 times carapace width; metatarsus

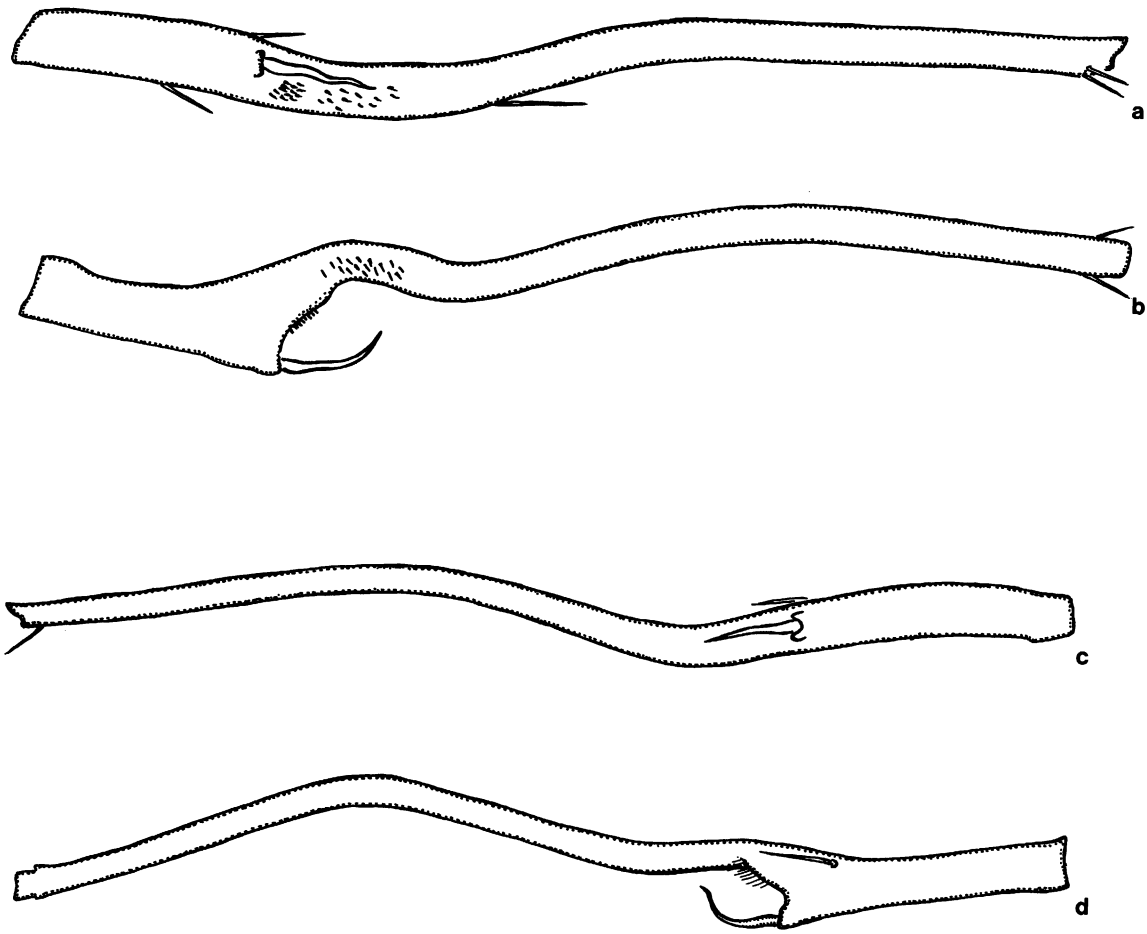

Fig. 97. *Phyxelida* spp., male metatarsi I. a, b. *bifoveata* (Strand), Uzungwa Mts., right. c, d. *tanganensis* (Simon and Fage) (lectotype of *Haemilla tanganensis* Simon and Fage), left. **a, c.** Retrolateral. **b, d.** Dorsal.

I (fig. 97c, d) with short subbasal retrolateral process surmounted by slender, sinuate clasping spine, distad of this segment strongly sinuate laterally and dorsoventrally, concavity opposite clasping spine lined with fine spinules and with basal mound covered with stiff setae. Spination: palpus: femur d0-0-1; leg I: femur d0-1-0-1-0, p0-0-1-1, r0-0-1-0-1, tibia p0-1-1-0, v2-0-0-0-2, r0-1-1-0, metatarsus p0-1-0-0-1, v1-1-1-1-2, r0-1-0-0-0; leg II: femur d1-1-0-0-0, p0-0-1-1-1, r0, tibia p0-1-1-0, v2-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg III: femur d1-1-0-0-0, p0-1-0-0-1, r0-1-0-0-1, patella d0-0-1, tibia d1-0-0-0, p0-1-1-0, v2-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-0-2-1, r1-1-0-2; leg IV: femur d1-0-1-0-0, p0-0-1-1-1, r0-0-1-0-1, tibia p0-1-1-0, v1-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v1-0-1-1, r0-1-0-2. Leg measurements:

	I	II	III	IV	Palp
Femur	7.00	5.92	5.00	5.92	1.42
Patella	1.67	1.33	1.25	1.33	0.58
Tibia	6.00	5.08	4.00	5.33	0.75
Metatarsus	7.33	6.00	5.08	6.67	–
Tarsus	2.50	2.17	1.75	2.25	1.17
Total	24.50	20.50	17.08	21.50	3.84

Palpal femur lacking anterobasal thorns, with only row of several short, slender setae; tibia

(fig. 98b) with bladelike D process much longer than truncate DA; palpal bulb (fig. 98a, c) with MA long, cylindrical, directed proximad, tapering to apex; embolus slender, spinelike, origins of embolus and lamellar pars pendula promedian; apex of conductor slender, strongly sinuate.

FEMALE (Grotte B of Kulumuzi): Total length 6.67. Markings as in male. Carapace 2.84 long, 2.08 wide; thoracic fovea deep, broad, length 0.15 carapace; clypeus 0.22 high; ocular area 0.31 long, 0.88 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.27:1.18:1.27, diameter of PM 0.13; AM separated by ½ their diameter, separated from AL by nearly AM diameter; PM separated by 1¼ their diameter, separated from PL by 1⅓ PM; lateral eyes nearly contiguous. Chelicerae 1.12 long, smooth, promargin of fang furrow with 3 small, 3 large, and 2 minute, retromargin with 3 small and 2 large teeth and 1 small tooth. Sternum 1.48 long, 1.28 wide, base broad, margin sinuate, apex pointed; labium 0.52 long, 0.56 wide; palpal coxa 0.92 long, 0.44 wide. Femur I 2.16 times carapace length. Spination: palpus: femur d0-0-1, patella d0-0-1, tibia d0-0-1, p0-0-1, tarsus p2-1-1, v1-1-2-1-2-2, r0-2-0; leg I: femur p0-0-1-1, r0-0-0-1, tibia p0-0-1-0, v0-0-0-1, r0-0-1-0, metatarsus p0-0-0-1, v2-2-1, r0-0-0-1; leg II: femur d0-0-1-0, p0-0-0-1, r0-0-0-1, tibia p0-0-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-1, r0-1-0-1; leg III: femur d1-1-0-0, r0-0-0-1, patella d0-0-1, tibia d1-0-0-0, p0-0-1-0, v0-0-0-2, r0-0-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia d1-0-0-0, p0-0-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-1, v1-1-0-1, r0-0-0-1. Palpal femur with row of slender anterobasal setae with enlarged bases. Calamistrum origin at 0.51 from metatarsus base, length 0.28 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	4.50	3.58	3.08	3.75	1.17
Patella	1.17	1.08	0.92	1.00	0.50
Tibia	4.08	2.58	2.33	3.17	0.75
Metatarsus	4.08	3.00	2.75	3.25	—
Tarsus	1.75	1.42	1.25	1.42	1.17
Total	15.58	11.66	10.33	12.59	3.59

Epigynum as in figure 98d, LTR recurved, copulatory openings hidden, epigynal plate smooth, unmodified, PML broad, width 2.81 times length, oval, sides curved, posterior margin convex; spermathecae as in figure 98e, with short, posterior, copulatory ducts leading into dorsomedian afferent chambers, anterior margin of each spermatheca with slender dorsomedian and conical ventrolateral lobes, ventrolateral efferent chamber leading to posterodorsal lobe (fig. 91f).

VARIATION: Total length 5.83–6.67; carapace length 1.33–1.36 times width; PER 1.14–1.21 times AER, 2.47–2.94 times OAL; OQP 1.19–1.23 times OQA, 1.09–1.27 times OQL; cheliceral length 4.62–4.85 times clypeal height, promargin of fang furrow with 6–8 teeth, retromargin with 6 or 7 teeth; labium length 0.96–1.00 times width; distance between spermathecae 0.69–1.04 times their length.

NATURAL HISTORY: All published and label data suggest that this species is restricted to caves.

DISTRIBUTION: North coastal area of Tanzania (fig. 112).

MATERIAL EXAMINED: TANZANIA: *Tanga*: Grotte du Kulumuzi, 1909 (C. Alluaud, MNHN), 1♂, 1♀ (syntypes of *Haemilla tanganensis* Simon and Fage); Grotte B. of Kulumuzi, near Kyomoni (Kiomoni, 5°04′S; 39°03′E), Apr. 16, 1912 (MNHN), 1♀.

Phyxelida fanivelona, new species

Figures 4d, 91h, 99c, d, 111

TYPES: Holotype and 2 paratype females from Fanivelona (Ambinanysakaleona) (20°32′S; 48°33′E), Fianarantsoa District, Madagascar (Sept.; no collector data), deposited in AMNH.

ETYMOLOGY: A noun in apposition from the type locality.

DIAGNOSIS: Epigynum as in figure 99c, PML oval, width about twice length, LTR recurved; spermathecae as in figures 91h and 99d, each trilobed, copulatory ducts median.

FEMALE (paratype): Total length 5.94. Carapace orange-brown, pars thoracica dusky along margin and with short reticulate anteromedian, median, and posteromedian radii, these broadest posteriorly; broad, dusky, v-shaped mark anteriad of thoracic fovea extending as thin line forward onto pars cephalica, and faint reticulations laterad of eyes; black pigment surrounding each eye and extending between AM and between lateral eyes;

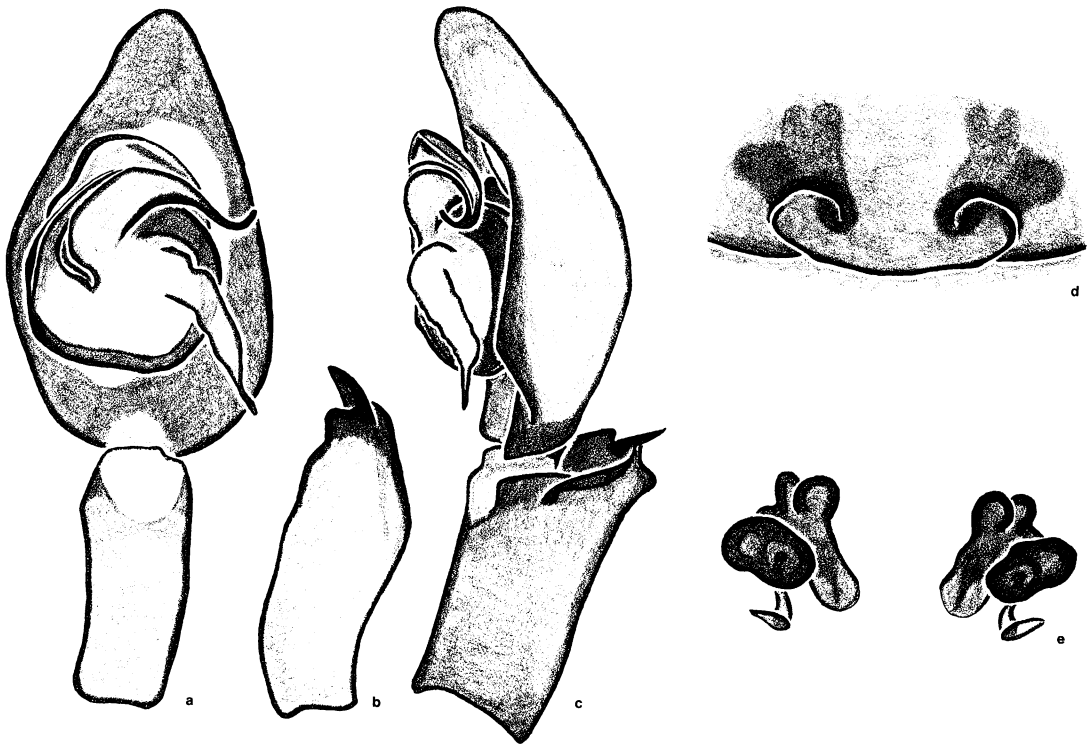

Fig. 98. *Phyxelida tanganensis* (Simon and Fage). a–c. Lectotype of *Haemilla tanganensis* Simon and Fage, male palpus. d, e Female, Kulumuzi. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. **d.** Epigynum, ventral. **e.** Spermathecae, dorsal.

chelicerae red-brown, boss yellow-brown; labium and palpal coxa orange-brown, tips lighter; sternum, coxae, trochanters, legs and palpi yellow-brown; sternum and coxae dusky. Legs with dusky annuli: basal, median and apical on femora II–IV, apical on patellae II–IV, and subbasal and apical on tibiae and metatarsi II–IV. Palpal tarsus red-brown; abdomen gray-brown, dorsum with anteromedian longitudinal light band and series of chevrons posteriorly, sides mottled with oblique longitudinal light and dark, venter with longitudinal pair of broken light bands. Carapace 2.34 long, 1.66 wide, margin entire; thoracic fovea deep, narrowed posteriorly, length 0.12 carapace; clypeus 0.18 high; ocular area 0.29 long, 0.82 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.50:1.17:1.50, diameter of PM 0.11; AM separated by ⅘ their diameter, separated from AL by AM diameter; PM separated by 1⅓ their diameter, separated from PL by 1½ PM; lateral eyes separated by ⅛ PL diameter. Chelicerae 1.06 long, robust, smooth, promargin of fang furrow with 6, retromargin with 4 large and 2 minute teeth. Sternum 1.25 long, 1.00 wide, apex a right angle; labium 0.47 long, 0.44 wide; palpal coxa 0.78 long, 0.41 wide. Femur I length 1.70 times carapace width. Spination: palpus: femur d0-0-0-1, tibia p0-1-1-0, tarsus p1-1-1-0, v0-1-2-3-3-2-1, r1-0-1-0; leg I: femur d0-1-0-0, p0-0-1-1, tibia p0-1-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p0-1-0-1, v2-2-0-1; leg II: femur d0-1-0-0, p0-0-0-1, tibia p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-1-1, r0-1-0-2; leg III: femur p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v0-2-0-1, r1-1-0-2; leg IV: femur d1-1-0-0, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-0-0-2, r0-1-1-0, metatarsus p1-0-0-2, v1-0-0-1, r1-0-0-2. Palpal femur with row of 8 stout anterobasal setae set in enlarged bases, distal 2 modified as thorns. Calamistrum origin at 0.42 from metatarsus base, length 0.31 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	2.81	2.19	1.81	2.43	0.88
Patella	0.93	0.81	0.69	0.81	0.44
Tibia	2.43	1.69	1.31	1.94	0.50
Metatarsus	2.31	1.69	1.38	1.94	—
Tarsus	1.06	1.00	0.88	1.06	1.06
Total	9.54	7.38	6.07	8.18	2.88

Epigynum as in figure 99c, copulatory openings hidden beneath recurved LTR, PML oval, narrow, width 2.07 times length, posterior margin procurved, rebordered posteriorly; spermathecae as in figure 99d, anterior margin of each with two lobes, with median copulatory duct leading to dorsomedian afferent chamber within slender lobe, ventrolateral median chamber within broad lobe, and large, spherical efferent chamber within posterior lobe (fig. 91h).

VARIATION: Total length 5.94–7.00; carapace length 1.40–1.48 times width, markings distinct to obscure; PER width 2.43–2.83 times OAL; OQP 1.29–1.38 times OQA, 1.18–1.38 times OQL; cheliceral length 5.23–6.00 times clypeal height; sternum length 1.19–1.25 times width; labium length 1.00–1.07 times width. Leg markings distinct to obscure; femur I length 1.53–1.70 times carapace width; abdomen with markings distinct to obscure, ventral longitudinal light bands broken to entire.

MALE: Unknown.

DISTRIBUTION: Known only from the type locality in the Fianarantsoa District, Madagascar (fig. 111).

Phyxelida apwania, new species

Figures 91g, 99e, f, 112

TYPE: Holotype female from 450 m elev. at Kwale, Coast Province, Kenya (Nov. 5, 1957; E. S. Ross & R. E. Leech), deposited in CAS.

ETYMOLOGY: The specific name is from the Swahili *pwani*, coast, referring to the distribution of this species.

DIAGNOSIS: Female with epigynum as in figure 99e, PML narrow, width less than twice length, sides concave, spermathecae as in figures 91g and 99f, anterior margin of each with slender dorsomedian and lateral lobes of nearly equal size.

FEMALE (holotype): Total length 5.63. Carapace orange-brown, with faint anteromedian, median, and posteromedian sclerotized radii on pars thoracica and extending anteriorly on pars cephalica; black pigment surrounding each eye and extending between AM and between lateral eyes; chelicerae orange-brown; labium and palpal coxa orange-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-brown, unmarked, palpal tarsus and metatarsi–tarsi I and II orange-brown; abdomen pale gray, markings obscure. Carapace 2.63 long, 1.81 wide; thoracic fovea broad, length 0.12 carapace; clypeus 0.24 high; ocular area 0.27 long, 0.80 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.25:1.17:1.50, diameter of PM 0.11; AM separated by ⅔ their diameter, separated from AL by AM diameter; PM separated by 1⅓ their diameter, separated from PL by 1½ PM; lateral eyes separated by ¼ PL diameter. Chelicerae 1.12 long, robust, smooth, promargin of fang furrow with 6, retromargin with 5 or 6 large and 2 minute teeth. Sternum 1.38 long, 1.22 wide, broad anteriorly, apex pointed; labium 0.50 long, 0.50 wide; palpal coxa 0.84 long, 0.47 wide. Legs elongate, femur I length 2.07 times carapace width. Spination: palpus: femur d0-0-1-1, patella d1-0-1, tibia p0-1-1-0, tarsus p2-0-1-1, v1-1-1-2-3-2; leg I: femur p0-1-1-1, tibia p0-1-1-0, r0-0-1-0, metatarsus p0-0-0-1, v1-1-1-1, r0-0-0-1; leg II: femur d1-0-0-0, p0-1-1-1, r0-0-0-1, tibia p0-1-1-0, r0-0-1-0, metatarsus p1-0-0-2, v2-0-2-1, r1-0-0-1; leg III: femur d1-0-0-0, p0-0-0-1, r0-0-0-1, tibia p0-1-1-0, v0-0-0-1, r0-1-1-0, metatarsus p0-1-0-2, v2-0-2-1, r0-1-0-2; leg IV: femur d1-0-0-0, r0-0-0-1, tibia p0-0-0-1, v0-0-0-2, r0-1-0-1, metatarsus p1-0-0-2, v2-1-0-1, r1-0-0-2. Palpal femur with row of 5 or 6 slender anterobasal setae, distal 2 with enlarged bases. Calamistrum origin at 0.49 from metatarsus base, length 0.32 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	1.88	1.50	1.25	1.59	0.53
Patella	0.50	0.47	0.44	0.44	0.22
Tibia	1.69	1.19	1.00	1.38	0.31
Metatarsus	1.72	1.25	1.09	1.47	—
Tarsus	0.69	0.59	0.53	0.63	0.63
Total	6.48	5.00	4.31	5.51	1.69

Epigynum as in figure 99e, LTR straight, PML narrowed in center, width 1.30 times length, broadened posteriorly, sides concave, pos-

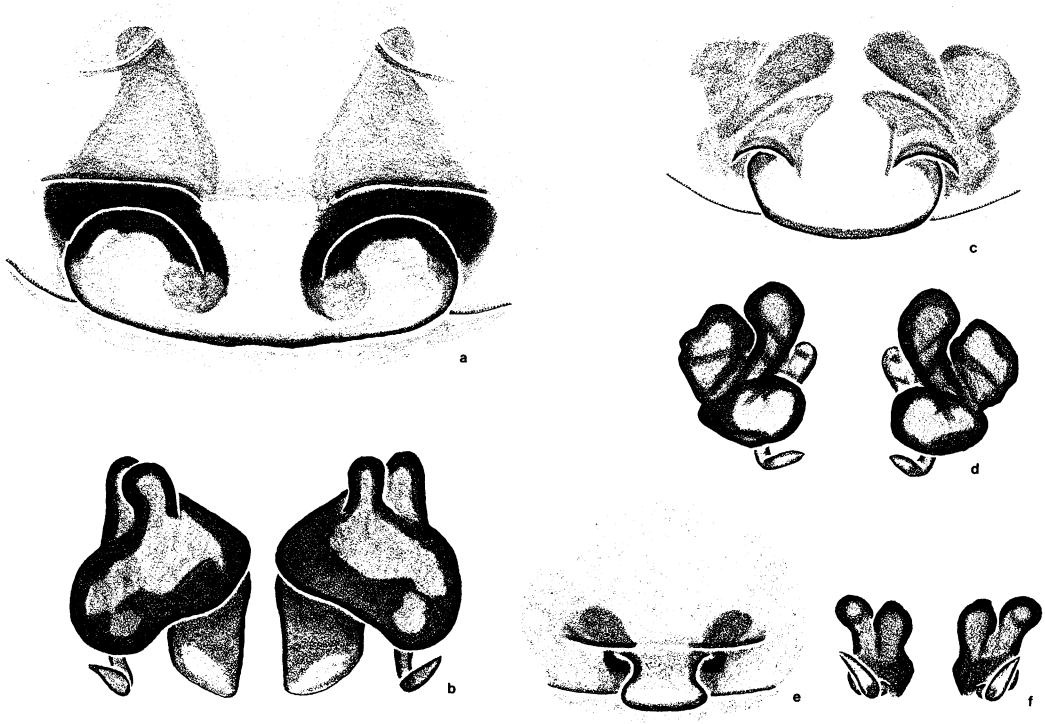

Fig. 99. *Phyxelida* spp., female genitalia. a, b. *bifoveata* (Strand), Musvenene-Kyondo Forest. c, d. *fanivelona*, new species, paratype. e, f. *apwania*, new species, holotype. **a, c, e.** Epigyna, ventral. **b, d, f.** Spermathecae, dorsal.

terior margin straight; spermathecae as in figure 99f, each with posterior copulatory duct leading into anterolateral afferent chamber with distal bulb, anterior margin with slender dorsomedian and lateral lobes of nearly equal size, efferent chamber slender (fig. 91g).

VARIATION: Total length 4.67–5.63; carapace length 1.33–1.45 times width; PER width 1.16–1.19 times AER, 2.80–2.94 times OAL; OQP 1.23–1.43 times OQA, 1.36–1.45 times OQL; cheliceral length 4.67–5.13 times clypeal height; labium length 0.95–1.00 times width.

MALE: Unknown.

NATURAL HISTORY: The only natural history data available (for specimens from coastal Tanzania) refer to caves, and it is possible that the Kenya specimens may also be from caves.

DISTRIBUTION: Coastal area of southeastern Kenya and northeastern Tanzania (fig. 112).

ADDITIONAL MATERIAL EXAMINED: KENYA: *Coast*: Shimba Hills, Kwale, 400 m elev., Aug. 28, 1977 (G. Coulon, MRAC), 2♀; Kilifi District, Apr. 4, 1978 (D. & M. Davis, B. Akerbergs, NMNH), 1♀. TANZANIA: *Tanga*: Grottes de Kyomani, 1958 (D. J. Carter, MRAC), 1♀.

Phyxelidini incertae sedis

Figures 74c, f, 93f, 111

NOTE: This species, known only from a unique female, is clearly a member of the tribe Phyxelidini. Unfortunately the characters of the female do not permit an unambiguous generic placement, and therefore a description is provided without formally naming the species.

DIAGNOSIS: Spermathecae as in figures 74f, 93f, bichambered, with median afferent and lateral efferent chambers; epigynum as in figure 74c, PML projecting posteroventrally.

FEMALE: Total length 3.94. Carapace pale yellow-brown, slightly darker on sides and anterior of pars cephalica; black pigment extending between AM and between lateral eyes; chelicerae yellow-brown, boss yellow-white; labium and palpal coxae pale yellow-brown, lighter at tips; sternum, coxae, trochanters, legs, and palpi yellow-white, unmarked except palpal tarsus and metatarsi–tarsi I and II yellow-brown; abdomen pale gray, unmarked. Carapace 1.72 long, 1.22 wide; thoracic fovea short, deep, length 0.13 carapace; clypeus 0.13 high; ocular area 0.18 long, 0.50 wide; ratio of eyes AM:AL:PM:PL, 1.00:1.38:1.38:1.63, diameter of PM 0.09; AM separated by ⅔ their diameter, separated from AL by AM diameter; PM separated by their diameter, separated from PL by PM diameter; lateral eyes nearly contiguous. Chelicerae 0.72 long, robust, smooth, promargin of fang furrow with 3 small and 2 large teeth and 1 minute tooth, retromargin with 4 large and 2 minute teeth. Sternum 0.91 long, 0.81 wide, broad anteriorly, margin entire, apex a right angle; labium 0.27 long, 0.31 wide; palpal coxae 0.50 long, 0.31 wide. Femur I length 1.44 times carapace width. Spination: palpus: femur d0-1-1, patella d1-0-1, tibia p0-1-1-0, tarsus p2-1-0-1, v0-1-1-2-2, r1-0-0-0; leg I: femur d0-1-0-0, p0-0-1-0, tibia p0-0-1-0, metatarsus v2-2-0-1; leg II: femur d0-1-0-0, p0-0-1-1, r0-0-0-1, tibia p0-0-1-0, r0-0-1-0, metatarsus p0-0-0-1, v2-2-0-1, r0-0-0-1; leg III: femur d0-1-0-0, p0-0-0-1, r0-0-0-1, patella d0-0-1, tibia p0-1-1-0, v0-0-0-2, r1-0-1-0, metatarsus p0-1-0-2, v2-0-1-1, r0-1-0-2; leg IV: femur d1-0-0-0, p0-0-0-1, r0-0-0-1, tibia d1-0-0-0, p0-1-1-0, v0-1-0-2, r0-1-1-0, metatarsus p1-1-0-2, v2-1-0-1, r0-1-0-2. Metatarsi without combs. Palpal femur with row of 2 short anterobasal thorns. Leg setae of ordinary, serrate type. Calamistrum origin at 0.49 from metatarsus base, length 0.20 that of segment. Leg measurements:

	I	II	III	IV	Palp
Femur	1.75	1.44	1.31	1.84	0.63
Patella	0.63	0.56	0.50	0.56	0.28
Tibia	1.56	1.19	0.97	1.56	0.44
Metatarsus	1.41	1.09	1.03	1.41	—
Tarsus	0.88	0.69	0.66	0.78	0.75
Total	6.23	4.97	4.47	6.15	2.10

Abdomen with epigynum as in figure 74c, PML projecting posteroventrally; spermathecae as in figures 74f and 93f, trapezoidal, bichambered, with median afferent and lateral efferent chambers.

MALE: Unknown.

DISTRIBUTION: Known only from the Langeberg Mountains, Cape Province, South Africa (fig. 111).

MATERIAL EXAMINED: *South Africa*: Cape Province: Grootvadersbosch Forest Station, 20 km WNW Heidelberg, elev. 1600 ft, indigenous forest, Nov. 9, 1985 (C. E. Griswold, NMSA), 1♀.

VYTFUTIINI, NEW TRIBE

Type genus *Vytfutia* Deeleman-Reinhold, 1986: 34.

DIAGNOSIS: The Vytfutiini may be distinguished from other Phyxelidinae by having the female epigynum (fig. 100d) with the posterior median lobe fused to the lateral lobes so that no suture is visible and by the presence of a retrolateral process (RL) on the male palpal tarsus and a sclerotized dorsal spur on male metatarsus I (fig. 101a–c).

COMPOSITION: One species.

DISTRIBUTION: Sumatra.

VYTFUTIA DEELEMAN-REINHOLD

Vytfutia Deeleman-Reinhold, 1986: 34 (type species by monotypy *Vytfutia bedel* Deeleman-Reinhold, holotype male in RMNH, examined).

Vytfutia bedel Deeleman-Reinhold

Figures 4a, 15a, 16a, 100a–e, 101a–c, 102

Vytfutia bedel Deeleman-Reinhold, 1986: 35 (male holotype and female paratype from Sumatra, RMNH, examined).

NOTE: Deeleman-Reinhold (1986: 34) described this species as having trichobothria on the tarsi. I have examined the male holotype and female paratype, including SEM examination of the latter, and found that tarsal trichobothria are lacking and there is only a single dorsal subapical metatarsal trichobothrium (fig. 15a). The setae which Deeleman-Reinhold apparently interpreted as tarsal and metatarsal trichobothria are remarkable, slender, erect setae which strong-

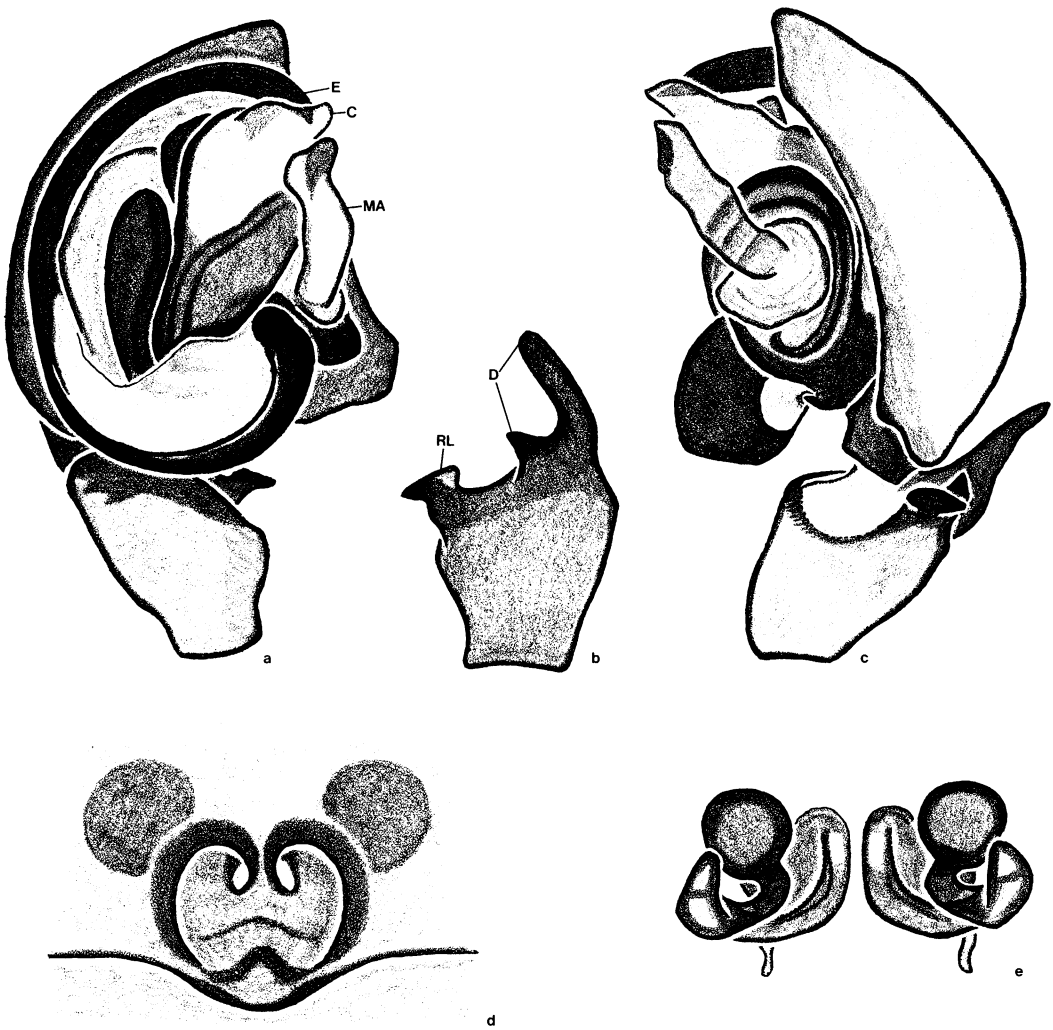

Fig. 100. *Vytfutia bedel* Deeleman-Reinhold, holotype male and paratype female. a–c. Male palpus. **a.** Tibia and tarsus, ventral. **b.** Tibia, dorsal. **c.** Tibia and tarsus, retrolateral. **d.** Female epigynum, ventral. **e.** Female spermathecae, dorsal. E = embolus; C = conductor; MA = median apophysis; D = dorsal tibial process; RL = retrolateral tibial process.

ly resemble trichobothria but arise from bases identical to ordinary leg setae. Trichobothrial patterns are among the most difficult character states to assess without SEM examination. *Vytfutia bedel* is in some ways the most plesiomorphic of the Phyxelidinae, retaining the retrolateral process (RL) on the male palpal tibia (fig. 100b) and a large, platelike median apophysis (MA) on the male palp (fig. 100a, c). *Vytfutia bedel* also retains the retrolateral clasping spine (fig. 101a–c) on male metatarsus I, which is lost by the Vidoleini and sporadically in the Phyxelidini. The female epigynum (fig. 100d) in which all vestige of a separate posterior median lobe and lateral lobes is lost is highly derived.

DIAGNOSIS: See tribal diagnosis.

DESCRIPTION: See Deeleman-Reinhold, 1986, for complete description; male palpus as in figure 100a–c; male metatarsus I as in figure 101a–c; female epigynum as in figure 100d, spermathecae as in figure 100e.

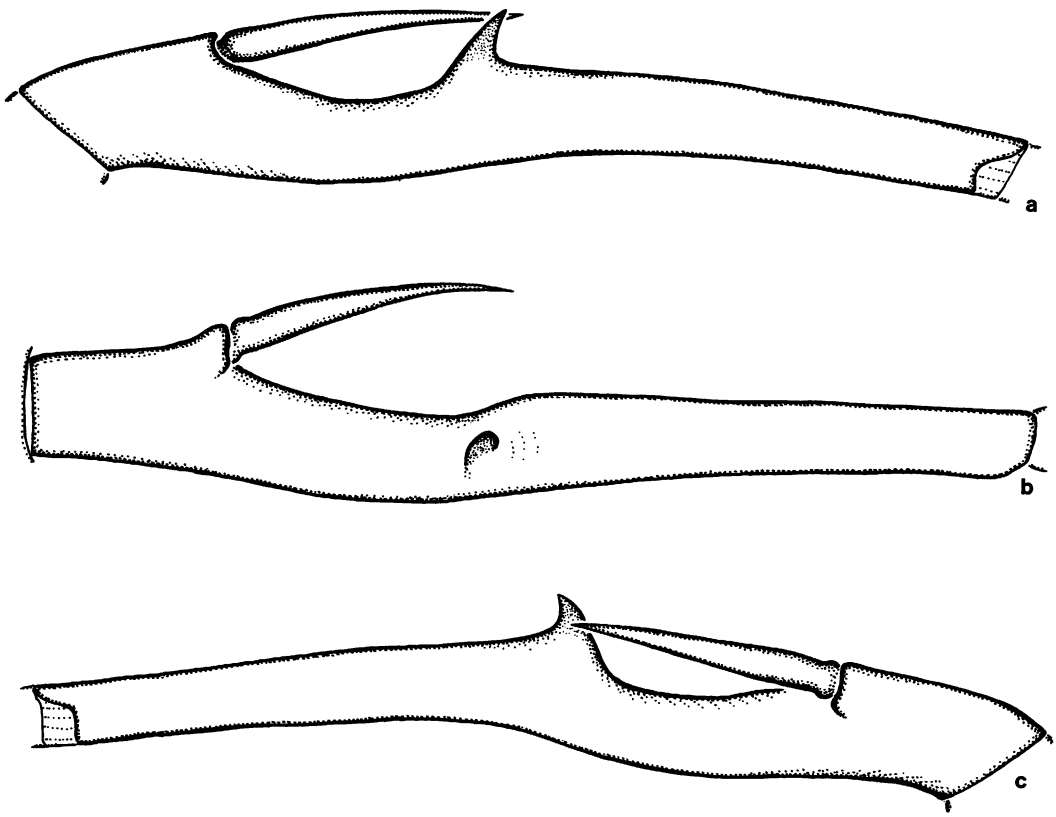

Fig. 101. *Vytfutia bedel* Deeleman-Reinhold, holotype male, left metatarsus I. **a.** Prolateral. **b.** Dorsal. **c.** Retrolateral.

NATURAL HISTORY: Deeleman-Reinhold (1986) stated that this species occurs in primary tropical rainforest, and noted that it is rare and apparently lives in isolated clusters.

DISTRIBUTION: Known only from the type locality in northern Sumatra (fig. 102).

MATERIAL EXAMINED: INDONESIA: *N. Sumatra*: Gunung Leuser, border of National Park at Bohorok in primary rainforest, Nov. 15, 1983, elev. 200 m, from leaves (Deeleman, RMNH), 1♂, 1♀ (male holotype and female paratype, *Vytfutia bedel* Deeleman-Reinhold).

BIOGEOGRAPHY

The Phyxelidinae occur in Africa, Madagascar, the eastern Mediterranean, and southeast Asia (fig. 102). In southeast Asia the subfamily is represented by a single endemic genus and species, *Vytfutia bedel*. The Vidoleini occur in southern Africa from southern Malawi to the Cape of Good Hope, and the Phyxelidini occur from the eastern Mediterranean south through eastern Africa to the Cape of Good Hope, and on Madagascar as well. The Phyxelidinae demonstrate a remarkable degree of endemism both at the generic and specific levels. There are perhaps only three species which may be considered widespread by virtue of their occurrence over large areas in contiguous but very different habitats or over widely disjunct patches of habitat of a certain type: *Phyxelida bifoveata* occurs in isolated patches of montane forest over much of central East Africa (fig. 112), *Xevioso orthomeles* occurs widely in bushveld in the Transvaal of South Africa but also

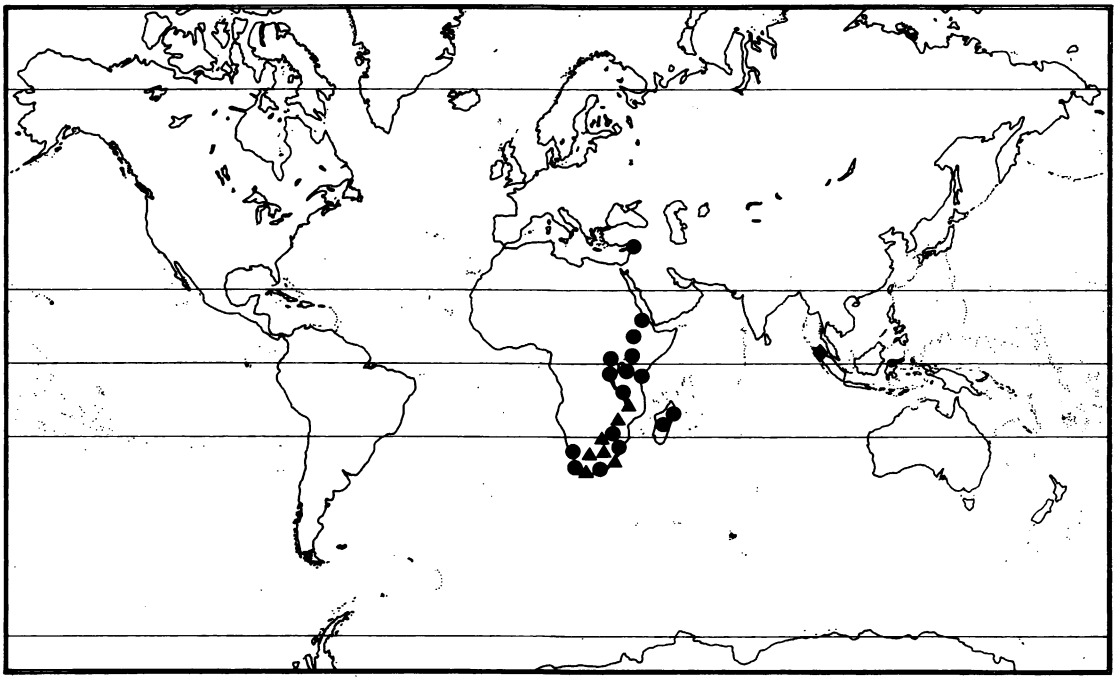

Fig. **102.** Map of the world showing the distribution of the tribes of Phyxelidinae: ◆ = Vytfutiini (*Vytfutia bedel* Deeleman-Reinhold); ▲ = Vidoleini; ● = Phyxelidini.

may occur in montane forest in Zimbabwe (fig. 106), and *Vidole capensis* occurs widely along the southern and western coasts of the Cape Province of South Africa (fig. 104) where this species lives in forest, fynbos and in coastal dunes vegetation. The remaining species are highly endemic, and many members of closely related taxa also show patterns of vicariance.

A striking feature of the distribution of the Phyxelidinae is the great richness in both genera and species in the southern part of Africa. I have divided the range of the Phyxelidini and Vidoleini into four divisions and tabulated the richness in genera and species and also calculated the proportions of endemics in each category for each region (an unnamed species from the southern Cape, Phyxelidini incertae sedis, is not included in these calculations). The eastern Mediterranean has only one nonendemic genus (*Phyxelida*) which contains the endemic species *P. anatolica.* Madagascar contains two genera (*Phyxelida* and *Ambohima*) of which one (*Ambohima*), or 50 percent, is endemic. All four Madagascan species are endemic. In tropical Africa, which I define here as including the area from Ethiopia south to the Limpopo River along the northern border of South Africa, there are three genera (*Phyxelida*, *Kulalania*, and *Xevioso*) of which one (*Kulalania* from the Kulal Mountains of Kenya), or 33 percent, is endemic. Seventeen species also occur in this area of which 16, or 94 percent, are endemic. Most of these species are endemic to montane forest on isolated mountains. South Africa comprises the area south of the Limpopo River and has very high degrees of endemism at both the generic and specific levels. Nine genera (*Lamaika*, *Malaika*, *Matundua*, *Namaquarachne*, *Phyxelida*, *Pongolania*, *Themacrys*, *Vidole*, and *Xevioso*) occur in this area, of which only *Phyxelida* and *Xevioso* are not endemic. In addition to the 77 percent generic endemism, 29 of 30 species, or 97 percent, are also endemic. The southwestern part of this region to the west to the area of Algoa Bay and the Uitenhage Basin has an extraordinary 80 percent generic endemism, with four (*Lamaika*, *Malaika*, *Matundua*, and *Namaquarachne*) of the five genera occurring here being restricted to this area.

It is particularly interesting to compare the richness and degree of endemism of the phyxelidine faunas of tropical Africa and

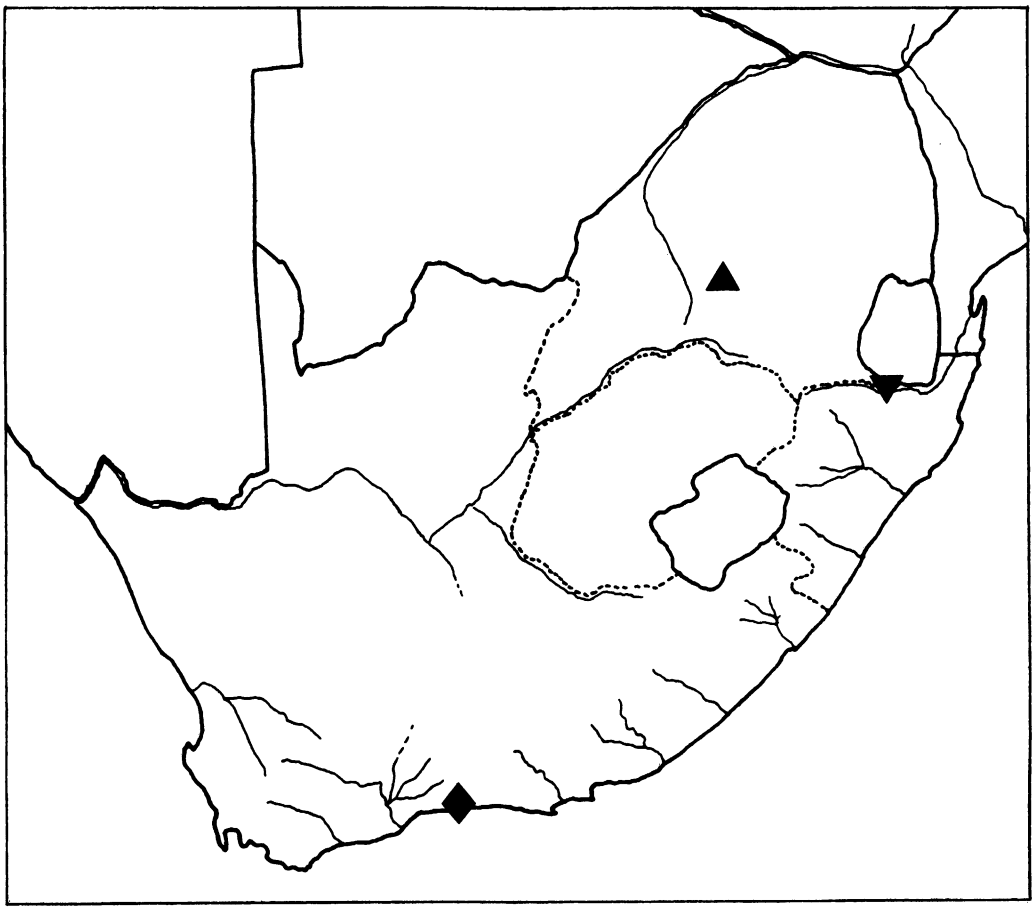

Fig. **103.** Map of southern Africa including South Africa, Lesotho, Swaziland, southern Botswana, and southern Namibia showing distributions of Vidoleini: ◆ = *Matundua silvatica* (Purcell); ▲ = *Pongolania chrysionaria*, n. sp.; ▼ = *Pongolania pongola*, n. sp.

South Africa. Although the former area is much larger geographically than the latter, species richness is roughly comparable (17 in tropical Africa and 30 in South Africa) and species endemism is virtually identical (94% vs. 97%). At the generic level, in contrast, both richness and endemism are strikingly skewed toward South Africa. Both generic richness and endemism in tropical Africa are low (three genera; 33% endemic); of these, *Xevioso* marginally occurs in tropical Africa while its center of richness lies in South Africa. The 77 percent generic endemism in South Africa is more than twice as great as that in tropical Africa, and a high proportion of these endemic genera are ones which stand in relatively plesiomorphic positions on the cladogram (fig. 13) (e.g., *Matundua* in the Vidoleini, *Namaquarachne* in the Phyxelidini, *Lamaika* in the Lamaika group of the Phyxelidini). This high level of endemism at a high categorical rank and the large proportion of possibly relictual genera suggest that the Phyxelidinae may have a longer history of diversification in South Africa than in the tropics.

A more discriminating picture of the distribution of the Phyxelidinae may be gained

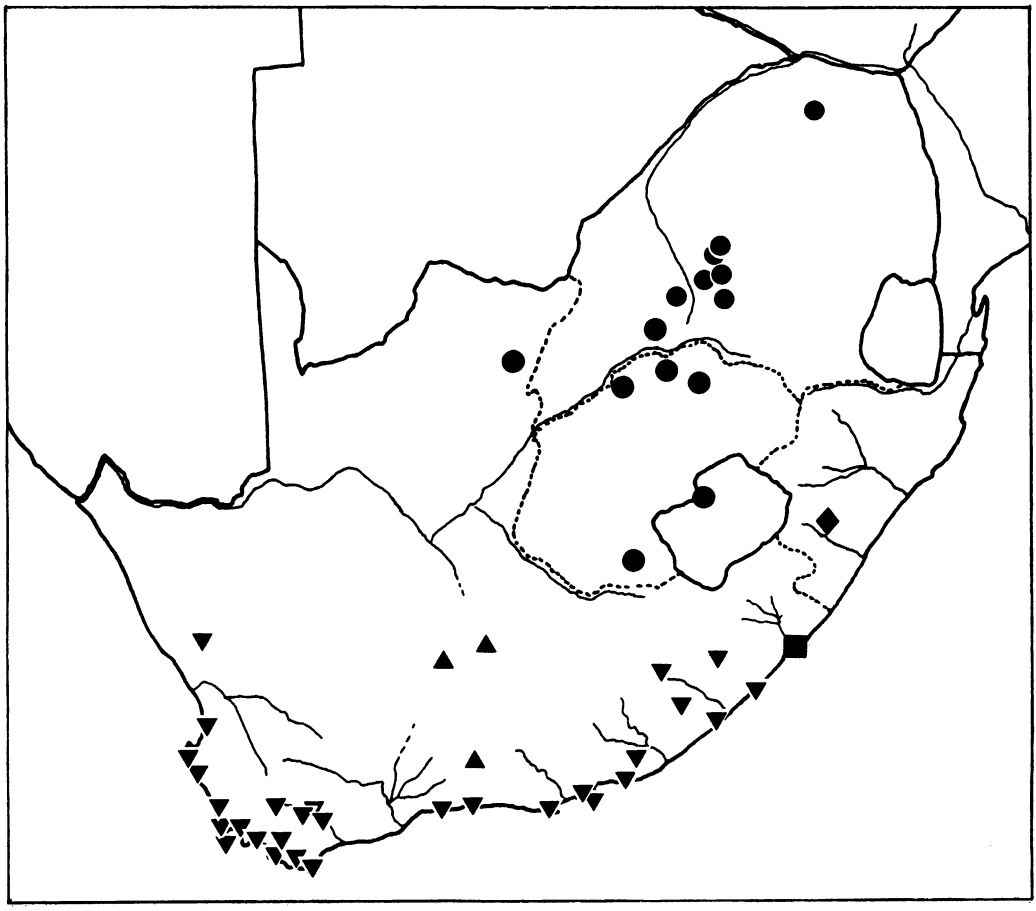

Fig. **104.** Map of southern Africa including South Africa, Lesotho, Swaziland, southern Botswana, and southern Namibia showing distributions of *Vidole*: ▼ = *V. capensis* (Pocock); ◆ = *V. helicigyna*, n. sp.; ■ = *V. lyra*, n. sp.; ▲ = *V. schreineri* (Purcell); ● = *V. sothoana*, n. sp.

from comparing the distribution of this subfamily to a detailed regional classification of the African biota. Such a classification may be found in White (1983) who classified the vegetation of Africa, Madagascar, and various surrounding islands into 22 areas reflecting both the physiognomy of characteristic vegetation types and centers of endemism. I have carefully compared the distribution of the African and Madagascan species of Phyxelidinae to White's areas, and have tabulated the numbers of genera and species (both total and endemic) which occur in each area, the percentages of genera and species occurring in the area which are endemic to that area, and the percentages of the total numbers of phyxelidine genera and species which are endemic to each area. These computations are based upon 12 phyxelidine genera but only 51 of the 53 valid species. The lower figure is used because I am unable to unambiguously assign two species to any of White's areas. There is not enough information on the original labels or in the original reference to *Malaika delicatula* (which occurs in the Hottentots Holland Mountains of the southwestern Cape) to determine if this species occurs in fynbos (White's region V)

or forest (White's region VIII), nor is there enough information on the original labels or in the original description of *Namaquarachne hottentotta* (which occurs near Garies in Namaqualand) to determine if this species occurs in fynbos (White's region V) or in the Karoo-Namib desert (White's region VI).

Phyxelidinae occurs in eight of White's 22 areas. The Zambezian regional center of endemism (II) contains two genera (*Vidole* and *Xevioso*), neither of which are endemic, and two nonendemic species. I have relimited the Cape regional center of endemism (V) to exclude forested areas at Grootvadersbosch and on the slopes of Table Mountain, classifying these into region VIII (Afromontane archipelago-like regional center of endemism). White (1983) did not differentiate these small areas from the surrounding Cape vegetation, but noted (White, 1983: 135) that there are forests of Afromontane affinity within regional center of endemism V, and therefore the phyxelidines occurring in these forests are better classified in regional center of endemism VIII. In the Cape regional center of endemism (V) neither of the two genera (*Namaquarachne* and *Vidole*) are endemic, but one (*Namaquarachne khoikhoiana*) of the two species (50%) which occur in the area is endemic, and 2 percent of the total phyxelidine species are endemic to this area. In the Karoo-Namib regional center of endemism (VI) neither of the two genera (*Namaquarachne* and *Vidole*) which occur there are endemic, but two (*Namaquarachne angulata* and *N. thaumatula*) of the three species (67%) are endemic, and 4 percent of the total phyxelidine species are endemic to this area. In the Zanzibar-Inhambane regional mosaic (XIII) the only genus which occurs there (*Phyxelida*) is not endemic, but both (100%) of the species which occur in the area (*P. apwania* and *P. tanganensis*) are endemic, and 4 percent of the total phyxelidine species are endemic to this area. In the Kalahari-Highveld regional transitional zone (XIV) neither of the two genera occurring there (*Pongolania* and *Vidole*) are endemic, but one of the three species (33%) is endemic, and 2 percent of the total phyxelidine species are endemic to this area. In the Tongaland-Pondoland regional mosaic (XV) none of the four genera (*Pongolania*, *Themacrys*, *Vidole*, *Xevioso*) occurring there is endemic, but 7 of the 13 species (54%) which occur in the area are endemic, and 14 percent of the total phyxelidine species are endemic to this area. Two genera (*Ambohima* and *Phyxelida*) occur in the East Malagasy regional center of endemism (XIX), of which 50 percent (*Ambohima*) are endemic, and all (100%) of the four species which occur in the area are endemic. Eight percent of the total phyxelidine genera and 8 percent of the total phyxelidine species are endemic to the East Malagasy regional center of endemism (XIX). Finally we must consider the Afromontane archipelago-like regional center of endemism (VIII) which occurs as a series of disjunct cool-temperate forest patches from the Cape through the mountains of East Africa to Ethiopia. Due to their physiognomy and dominance by *Podocarpus* I consider the forests of the southern slopes of the Langeberg and of the mountains of the Cape Peninsula to belong to this area. This is an area of striking richness and endemism for the Phyxelidinae. Forty four percent of the nine genera occurring here are endemic to this area (endemic: *Kulalania*, *Lamaika*, *Malaika*, and *Matundua*; nonendemic: *Namaquarachne*, *Phyxelida*, *Themacrys*, *Vidole*, and *Xevioso*), and 33 percent of the total phyxelidine genera are endemic to this area. Of the 30 species which occur in the area, 24 (80%) are endemic, and fully 47 percent of the total phyxelidine species are endemic to the Afromontane archipelago-like regional center of endemism (VIII).

The Phyxelidinae may reasonably be considered an "Afromontane" group with this area having the highest degree of richness and proportion of endemism. The Tongaland-Pondoland regional mosaic (XV), which is the area of second greatest richness and specific endemism, is known for its mixture of Afromontane and tropical taxa. The archipelago-like pattern of disjunctions shown by the Afromontane biota has attracted much interest from ecologists and biogeographers, and the origin of this pattern is highly controversial. Some workers (e.g., Moreau, 1966; White, 1978) consider that this pattern of disjunctions arose through previous expansion and coalescence and subsequent fission

of this biota as a unified community, whereas other workers (e.g., Hamilton, 1982; Livingstone, 1975) believe individual dispersal to have been of paramount importance. The phylogenetic and geographic relationships of the Phyxelidinae may provide useful clues toward resolving this controversy.

Whereas such bioaccountancy may be both necessary and sufficient to describe the distribution of the Phyxelidinae as it exists today, an attempt to understand the history of this distribution must be based on a sound understanding of the phylogeny, as depicted by a cladogram, of the taxa involved. As Hennig (1966: 3) suggested, the essential method for understanding biogeographic relationships is the "search for the sister group." And, as Platnick (1978: 475) has pointed out, it is the interrelationships among allopatric endemics rather than widespread taxa which provide the data for posing historical biogeographic hypotheses. In this regard it is useful to examine the distribution of sister groups within the Phyxelidinae, and to point out congruent patterns whenever possible.

The most plesiomorphic genus in the Vidoleini, *Matundua*, is found only in cool temperate forest in the southern Cape Province, South Africa (fig. 103). Of the remaining three genera of the Vidoleini, *Vidole* and *Xevioso* are widespread in southern Africa, whereas *Pongolania* (fig. 103) occurs in the bushveld and highveld of the southern Transvaal Province, South Africa.

Vidole contains five apparently allopatric species (fig. 104). The most plesiomorphic, *V. helicigyna*, occurs in the Natal midlands. A relatively apomorphic clade (fig. 20) of four species occurs widely in South Africa from the Limpopo River to the Cape of Good Hope. A trichotomy in the cladogram supports *V. lyra* from the Transkei coast, *V. sothoana* which occurs in the highveld regions of Lesotho and South Africa, and two species occurring in the southern part of Cape Province. Of these, *V. schreineri* occurs in the interior arid lands of the Karroo, whereas its allopatric sister species *V. capensis* is widespread along the southern Cape coast. With the exception of *V. lyra* and many populations of *V. capensis*, *Vidole* is exceptional among the Phyxelidinae in that the majority of species occur in drier, open habitats rather than forest or closed-canopy bush. In fact, some populations of *V. schreineri* occur in some of the driest parts of Africa.

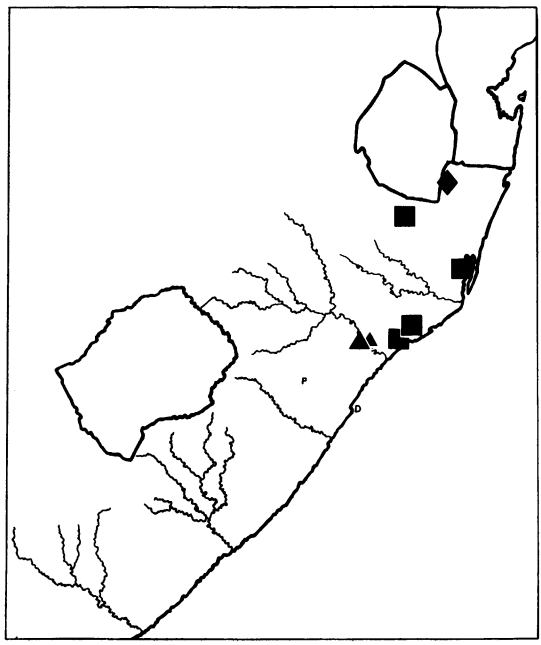

Fig. **105.** Map of eastern southern Africa including southern Mozambique, Swaziland, Lesotho, and southeastern Transvaal, Natal (P = Pietermaritzberg, D = Durban), and Transkei of South Africa showing distribution of *Xevioso* spp.: ■ = *X. amica*, n. sp.; ◆ = *X. tuberculata* (Lawrence); ▲ = *X. zuluana* (Lawrence).

Xevioso is largely allopatric to the other genera of the Vidoleini, though sympatry with *Pongolania* in the eastern Transvaal and with *Vidole* in the northern part of the latter's range is possible. With the exception of *X. orthomeles*, *Xevioso* species appear to be mostly allopatric and narrowly endemic (figs. 105, 106). The most plesiomorphic species of *Xevioso* is *X. jocquei* found on Mt. Mlanje in southern Malawi. The remaining eight species form a relatively apomorphic clade (fig. 31) which is almost wholly endemic to South Africa (the exception being the extension of the widespread species *X. orthomeles* into Zimbabwe). The relatively most apomorphic clade of the South African group comprises four allopatric species from the low country of Natal and the Transvaal (excepting the Zim-

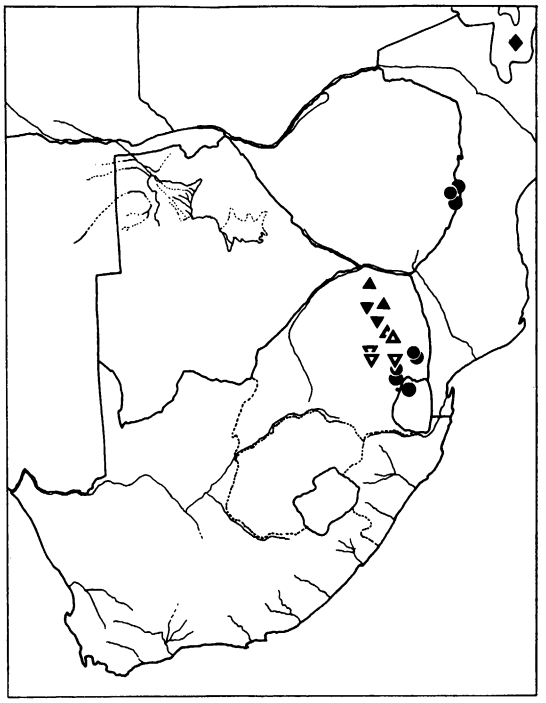

Fig. **106.** Map of southern Africa including South Africa, Lesotho, Swaziland, Zimbabwe, Botswana, eastern Namibia, southern Mozambique, and southern Malawi showing distribution of *Xevioso* spp.: ▽ = *X. aululata*, n. sp.; △ = *X. colobata*, n. sp.; ◆ = *X. jocquei*, n. sp.; ▲ = *X. kulufa*, n. sp.; ▼ = *X. lichmadina*, n. sp.; ● = *X. orthomeles*, n. sp.

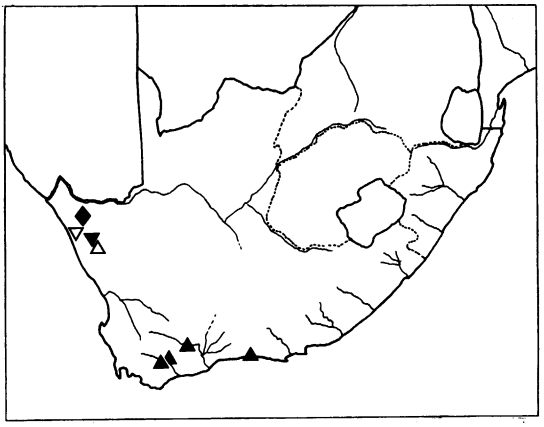

Fig. **107.** Map of southern Africa including South Africa, Lesotho, Swaziland, southern Botswana, and southern Namibia showing distributions of *Namaquarachne*: ▽ = *N. angulata*, n. sp.; △ = *N. hottentotta* (Pocock); ▼ = *N. khoikhoiana*; ◆ = *N. thaumatula*, n. sp.; ▲ = *N. tropata*, n. sp.

babwian distribution of *X. orthomeles*). Most apomorphic is the sister species pair *X. amica* (which occurs widely in northern Zululand) and the widespread species *X. orthomeles* (which occurs from the Transvaal lowveld into the mountains of eastern Zimbabwe). Its sister group is *X. tuberculata* from the Lebombo Mountains on the border between Swaziland and Maputaland, and the sister group of these three species together is *X. zuluana* from the middle Tugela River basin in Zululand (fig. 105). The sister group of the four species from the low country of Natal and the Transvaal is the allopatric species pair *X. lichmadina* plus *X. kulufa* from the northern Transvaal Drakensberg (fig. 106). The allopatric sister species pair *X. colobata* plus *X. aululata* occurring in the central Transvaal Drakensberg Mountains forms the relatively plesiomorphic sister group (fig. 31) to the remaining species (fig. 106). All of the species of *Xevioso* appear to occur in coastal or montane forest, or in riverine or gallery forest where this occurs within drier vegetation formations.

Among the Phyxelidini the enigmatic genus *Namaquarachne* occurs in the most plesiomorphic position on the cladogram (fig. 13). This genus is divided into two sister clades (fig. 50). One clade which occurs entirely in Namaqualand includes the sister species *N. thaumatula* from the lowlands near Steinkopf and *N. hottentotta* from the mountainous region near Garies (fig. 107). The other clade comprises the relatively plesiomorphic species *N. tropata* which occurs in moist forests in the southern Cape Province and the sister species pair *N. angulata* from Kamaggas and *N. khoikhoiana* from high elevation in the Kamiesburg Mountains. As all the Namaqualand species of *Namaquarachne* are known from single collections the ranges of these species cannot be predicted with certainty, but as Namaqualand is known as an area of narrow endemism it is possible that all the Namaqualand species are allopatric. *Namaquarachne* is unusual among the Phyxelidinae in that only one species, *N. tropata*, occurs in the moist forests so typical for the subfamily, whereas the others occur in semiarid to arid formations (fig. 107).

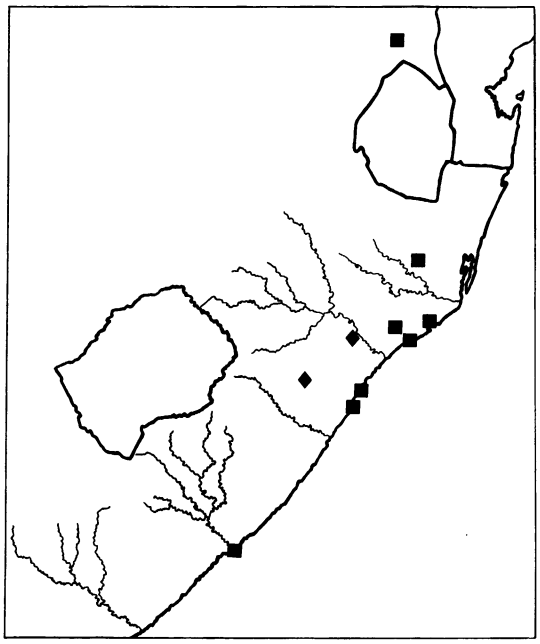

Fig. **108.** Map of eastern southern Africa including southern Mozambique, Swaziland, Lesotho, and southeastern Transvaal, Natal, and Transkei of South Africa showing distribution of *Themacrys* spp.: ◆ = *T. cavernicola* (Lawrence); ■ = *T. irrorata* Simon.

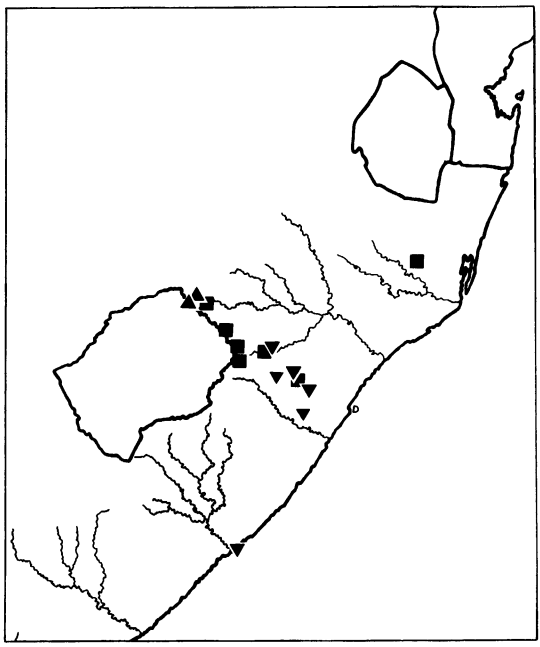

Fig. **109.** Map of eastern southern Africa including southern Mozambique, Swaziland, Lesotho, and southeastern Transvaal, Natal (D = Durban), and Transkei of South Africa showing distribution of *Themacrys* spp.: ■ = *T. monticola* (Lawrence); ▼ = *T. silvicola* (Lawrence); ▲ = *T. ukhahlamba*, n. sp.

The Lamaika group of the Phyxelidini (fig. 13), comprising the genera *Lamaika*, *Malaika*, *Kulalania*, and *Ambohima*, exhibits an extraordinary distribution including much of Africa and stretching across the Mozambique Channel to Madagascar (fig. 110). The relatively most apomorphic clade includes the two allopatric species of *Ambohima* in the central highlands and on the eastern coast of Madagascar and their sister group *Kulalania antiqua* from montane forest in the Kulal Mountains of Kenya. The sister group of the Kenyan and Malagasy genera is *Malaika* which comprises two allopatric species in the extreme southwestern Cape Province of South Africa. *Malaika longipes* occurs in the mountains of the Cape Peninsula and *M. delicatula* occurs in the Hottentots Holland Mountains. Finally, the plesiomorphic sister group of these three genera is *Lamaika distincta*, occurring in coastal forest at Ruigtevlei in the southern Cape Province, South Africa. All members of the Lamaika group appear to occur in moist habitats, particularly forest. The vast inter- and intracontinental disjunctions shown by this group suggests a possible great age.

The remaining Phyxelidini groups (fig. 13) comprise three allopatric taxa: the unplaced female Phyxelidini incertae sedis from the Langeberg Mountains in the Cape Province of South Africa (fig. 111), *Themacrys* from eastern South Africa (figs. 108, 109), and *Phyxelida* which ranges from northern South Africa to the eastern Mediterranean and Madagascar (figs. 111–113). It is most unfortunate that the absence of data for the Phyxelidini incertae sedis from the southern Cape has not permitted the resolution of the trichotomy in the cladogram, because the relationship of the western Cape, eastern South Africa (east and north of Algoa Bay and the Uitenhage Basin), and tropical Africa is one of the most interesting questions in African biogeography (e.g., Stuckenberg, 1962; Griswold, 1985).

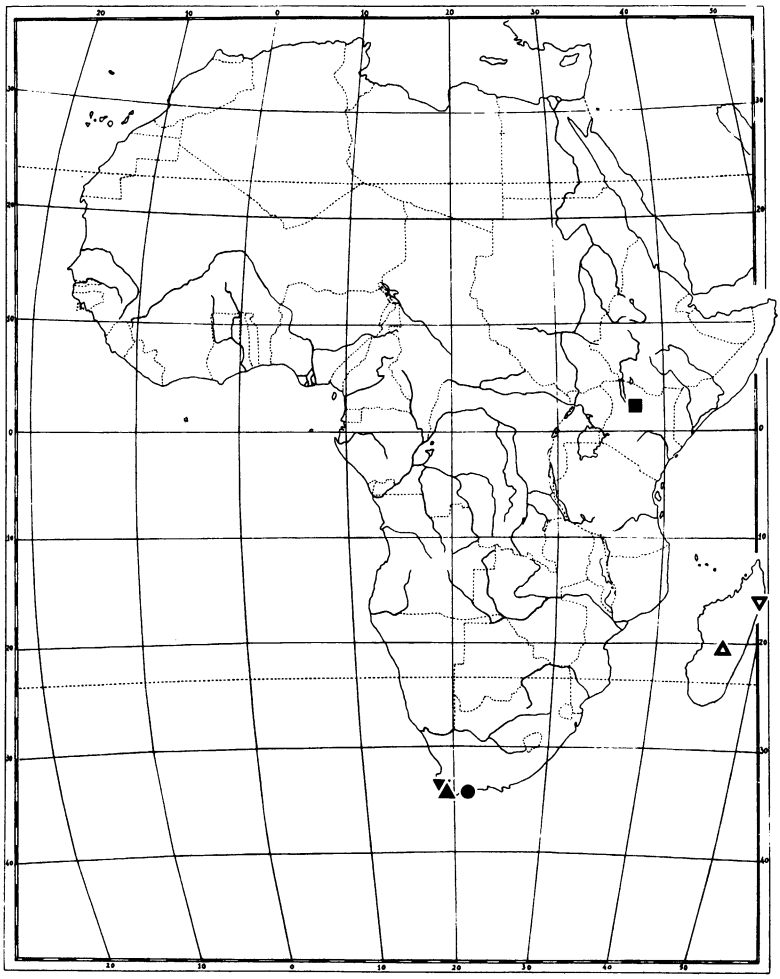

Fig. **110.** Map of Africa, Madagascar, and the eastern Mediterranean showing distribution of Phyxelidini: ● = *Lamaika* distincta, n. sp.; ▲ = *Malaika delicatula*, n. sp.; ▼ = *M. longipes* (Purcell); ■ = *Kulalania antiqua*, n. sp.; ▽ = *Ambohima pauliani*, n. sp.; △ = *A. sublima*, n. sp.

The genus *Themacrys* is characterized by a great deal of sympatry, with each of the five species being sympatric with one or more other *Themacrys* species. *Themacrys* occurs from the northern Transkei coast to the southern Transvaal, and appears to be restricted to forest, dense bush, or caves. The genus is divided into two sister groups (fig. 69). One group (fig. 108) includes the apparently allopatric sister species pair *T. cavernicola* (known from caves in the Natal midlands) plus *T. irrorata* (which occurs widely in Zululand and coastal regions of Natal and the Transkei). The other group (fig. 109) comprises the three species *T. ukhahlamba*, *T. silvicola*, and *T. monticola*. *T. ukhahlamba* and *T. silvicola* are allopatric sister species, with the former occurring in the Drakensberg Mountains and the latter occurring at mid, elevations in central Natal and in the coastal regions of southern Natal and the Transkei. The sister group of these species is *T. monticola* which is widespread in the interior of Natal and is sympatric with *T. ukhahlamba* in the Drakensberg Mountains, with *T. silvicola* and *T. cavernicola* in the Natal Midlands, and with *T. irrorata* in Zululand.

With 19 species occurring from northern

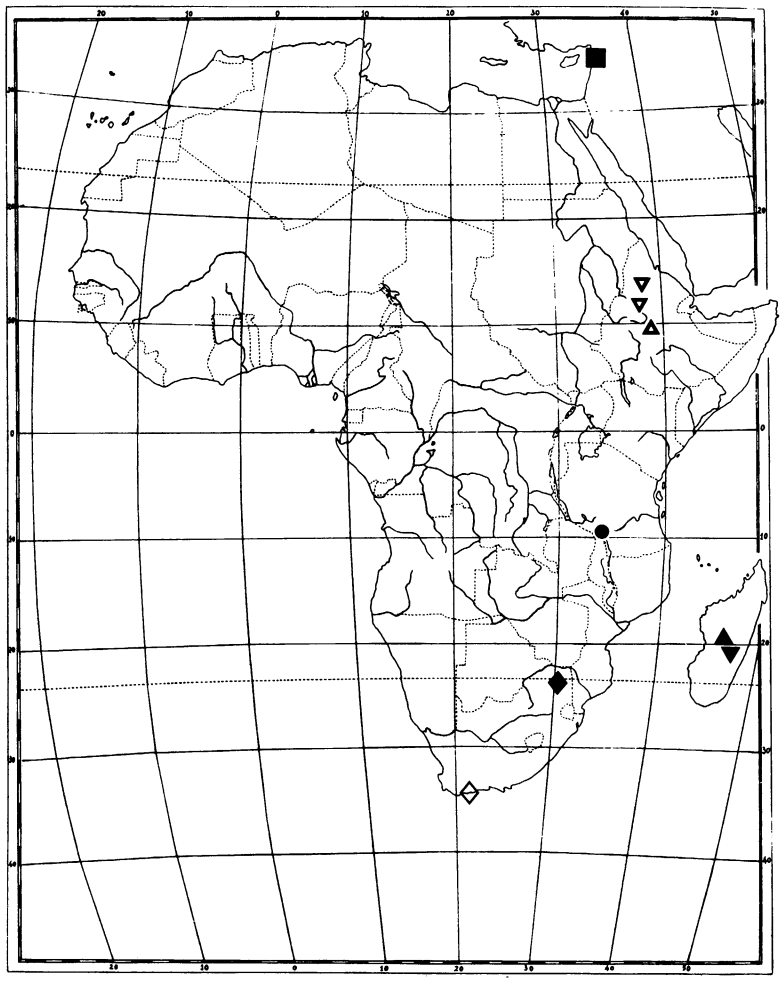

Fig. 111. Map of Africa, Madagascar, and the eastern Mediterranean showing distribution of *Phyxelida* spp.: △ = *P. abyssinica*, n. sp.; ■ = *P. anatolica*, n. sp.; ▼ = *P. fanivelona*, n. sp.; ● = *P. kipia*, n. sp.; ◆ = *P. makapanensis* Simon; ▲ = *P. malagasyana*, n. sp.; ▽ = *P. mirabilis* (L. Koch); and ◇ = Phyxelidini incertae sedis.

South Africa to the eastern Mediterranean and Madagascar *Phyxelida* is the largest and most widespread genus in the Phyxelidinae. *Phyxelida* is principally a genus of tropical montane forest. All extratropical species (i.e., *P. makapanensis* and *P. anatolica*) and tropical lowland species (e.g., *P. apwania* and *P. tanganensis*) occur in caves. It is a genus of narrow endemics, with only *P. bifoveata* which occurs in the disjunct highlands of central East Africa being widespread. Given the wide geographic scope and considerable endemism shown by this genus it is most unfortunate that, due to missing data for one or another sex for 13 of the 19 species, the cladogram (fig. 81) for *Phyxelida* is poorly resolved. From the basal pentachotomy there arise species (fig. 111) from Turkey (*P. anatolica*), montane East Africa (*P. pingoana*), and Madagascar (*P. malagasyana*), as well a clade comprising the sister species pair *P. sindanoa* plus *P. carcharata* from montane East Africa (fig. 112), and a clade of 14 species ranging from the Transvaal to Ethiopia and Madagascar. There is fairly good resolution among some of the species of this clade, in

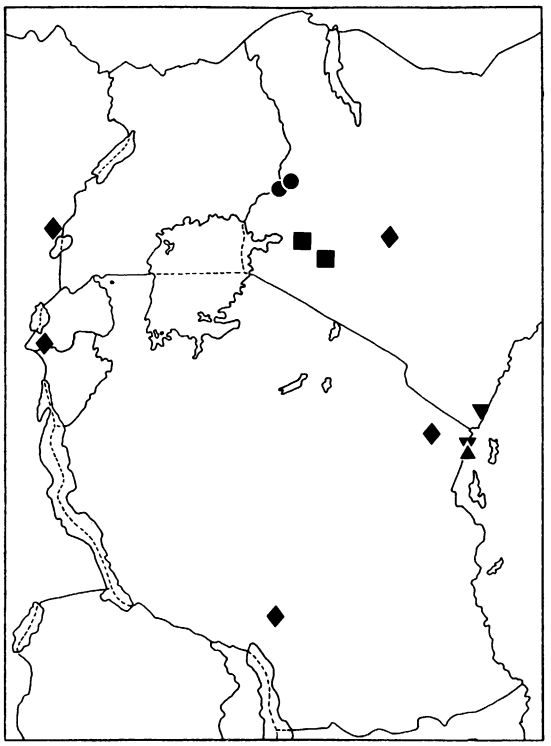

Fig. 112. Map of eastern tropical Africa including Kenya, Tanzania, Uganda, Rwanda, Burundi, eastern Zaire, and northern Malawi and Zambia showing distributions of *Phyxelida* spp.: ▼ = *P. apwania*, n. sp.; ◆ = *P. bifoveata* (Strand); ■ = *P. carcharata*, n. sp.; ● = *P. sindanoa*, n. sp.; ▲ = *P. tanganensis* (Simon & Fage).

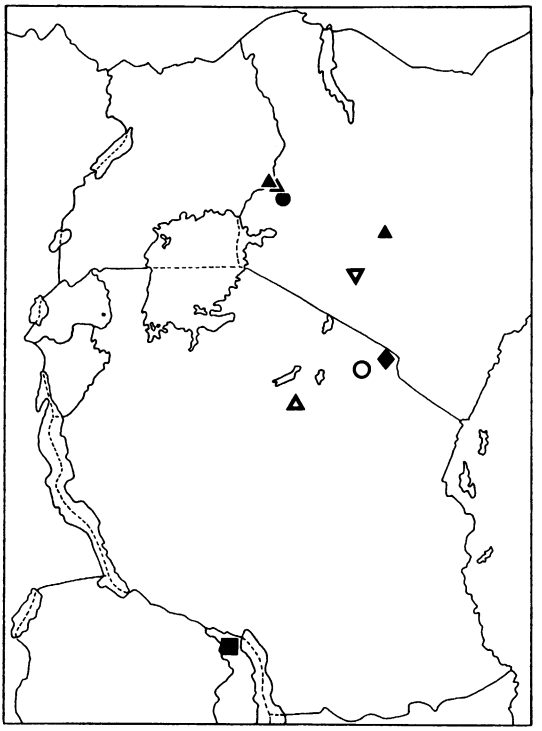

Fig. 113. Map of eastern tropical Africa including Kenya, Tanzania, Uganda, Rwanda, Burundi, eastern Zaire and northern Malawi and Zambia showing distributions of *Phyxelida* spp.: ● = *P. crassibursa*, n. sp.; ■ = *P. eurygyna*, n. sp.; ▽ = *P. irwini*, n. sp.; ○ = *P. jabalina*, n. sp.; ◆ = *P. nebulosa* (Tullgren); ▲ = *P. pingoana*, n. sp.; △ = *P. umlima*, n. sp.

some cases describing striking biogeographic patterns. The Nebulosa group comprises six species from montane East Africa (fig. 113). There are five unresolved species including *P. nebulosa* from Mt. Kilimanjaro, *P. irwini* from near Nairobi, *P. umlima* from Mt. Hanang, *P. crassibursa* from the vicinity of Mt. Elgon, and *P. eurygyna* from the Nyika Plateau in northern Malawi. The sister group of these five species is *P. jabalina* from Mt. Meru. The sister group of the Nebulosa group is the Tanganensis group, comprising the species *P. bifoveata*, *P. tanganensis*, *P. fanivelona*, and *P. apwania*, which exhibits a strikingly disjunct distribution. The relatively most apomorphic clade is the allopatric sister species pair *P. bifoveata* (widespread in the disjunct highlands of central East Africa) and *P. tanganensis* (occurring in caves along the Tanzanian coast). The sister group of these two species is *P. fanivelona* from the central highlands of Madagascar (fig. 111). The most plesiomorphic species in this group is *P. apwania* which occurs in coastal Kenya and Tanzania, possibly restricted to caves, and which is sympatric with *P. tanganensis* in the Kyomani caves of northern coastal Tanzania (fig. 112). Finally, the sister group of the Nebulosa plus Tanganensis groups is the Makapanensis group comprising the species *P. makapanensis*, *P. kipia*, *P. mirabilis*, and *P. abyssinica*, and exhibiting a strikingly disjunct distribution ranging from the Transvaal to Ethiopia (fig. 111). The relatively most apomorphic clade is the allopatric sister species pair *P. mirabilis* and *P. abyssinica* which occurs in the central to northern highlands of Ethiopia. The sister group of these species is *P. kipia* from the Uzungwa Mountains in southwestern Tanzania. The plesio-

morphic sister group of these three species is *P. makapanensis* which is restricted to caves in the northern Transvaal Province of South Africa. It is interesting that a species from south of the Limpopo River should show affinities to taxa to the north in tropical Africa rather than to those in the south.

Do any general patterns emerge from consideration of the distributions of sister groups among the Phyxelidinae? One striking apparent pattern is the closer relationship between taxa occurring in East Africa and Madagascar (i.e., *Kulalania* and *Ambohima*; *Phyxelida bifoveata* plus *P. tanganensis* and *P. fanivelona*; and the Malagasy species *Phyxelida malagasyana* which is unresolved at the bottom of the *Phyxelida* cladogram (fig. 81) may also be expected to show a sister group relationship to some East African taxon) than to taxa occurring in southern Africa. This area relationship may not be construed as general, however, because the areas of endemism defined by the ranges of the East African taxa and by the plesiomorphic southern Africa sister groups differ in each case. In the first case *Kulalania* occurs in the Kulal Mountains in northern Kenya, and *Malaika*, the plesiomorphic southern African sister group of *Kulalania* plus *Ambohima*, occurs in the southwestern Cape (fig. 110). In the second case the clade of *Phyxelida bifoveata* plus *P. tanganensis* occurs in eastern Zaire, Rwanda, Tanzania, and southern Kenya (fig. 112), and the plesiomorphic sister group of these species plus the Malagasy *P. fanivelona* is *P. apwania*, also from East Africa. The plesiomorphic sister group of *Phyxelida* is either *Themacrys* from Natal or the unplaced female Phyxelidini incertae sedis from the southern Cape.

A second apparent pattern which holds only for forest-dwelling taxa is the closer relationship between those occurring in eastern South Africa (e.g., the Ciskei, Transkei, Natal, and the Transvaal) and tropical Africa than to taxa occurring in the Cape (i.e., that area to the south and west of Algoa Bay and the Uitenhage basin). This pattern is shown by the Vidoleini if one eliminates from consideration those taxa which do not occur in forest (e.g., *Pongolania*; *Vidole helicigyna*, *V. sothoana*, and *V. schreineri*) and taxa which are widespread (i.e., *Vidole capensis*). The forest-dwelling *Vidole lyra* occurs in the Transkei, and the related genus *Xevioso* occurs in Natal, the Transvaal Drakensberg, and in tropical Africa in the mountains of eastern Zimbabwe and at Mt. Mlanje in Malawi. The plesiomorphic sister group of *Vidole* plus *Xevioso* is *Matundua* (*Pongolania* is excluded from consideration as a non forest-dwelling taxon) from the moist forests of the southern Cape (fig. 103). In a rough manner this distribution parallels that of the resolved clades among the forest-dwelling Quercina group of the migid (tree trapdoor spider) genus *Moggridgea* (Griswold, 1987b: fig. 409). One clade, including the species *Moggridgea quercina*, *M. teresae*, and *M. intermedia*, occurs in the forests of the southern Cape, whereas a second clade includes *M. microps* from the forests of the Ciskei, Transkei, Natal, and the eastern Transvaal, and *M. verruculata* and *M. anactenidia* from tropical Africa. The strength of the biogeographic dichotomy between these two clades is compromised by three unresolved species (from tropical Africa, the Transvaal, and the southern Cape) of the Quercina group also arising from the same node: although these species provide no information regarding the relationships of the resolved clades, they may contradict these relationships when ultimately resolved. In this regard it is particularly unfortunate that the trichotomy (fig. 13) among Phyxelidini incertae sedis, *Themacrys*, and *Phyxelida* cannot yet be resolved, but I predict that ultimately *Phyxelida* (from tropical Africa and Madagascar) and *Themacrys* (from eastern South Africa) will be found to be more closely related than either is to a taxon from the southern Cape.

While provocative, the patterns outlined here can not yet be considered as general because in most cases the taxa involved in the approximately parallel distributions of sister groups outline different areas of endemism. Areas such as "East Africa," "tropical Africa," or "southern Africa" which are not defined by the ranges of endemic taxa may not be used as areas of endemism for biogeographic analysis. This discussion serves only to present some surprising possibilities in African biogeography and to focus attention on areas particularly worthy of further collection and study.

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APPENDIX 1

List of amaurobioid, dictynoid, and lycosoid species other than Phyxelidinae which were examined during the course of this study. Familial and subfamilial placement follows Lehtinen (1967). Original generic placement, if different from current, is listed in parentheses. Collection listed at end of entry.

Agelenidae

Agelena labyrinthica (Clerck) 1757 (*Araneus*) ♂ (Ageleninae) NMNH

A. opulenta (L. Koch) 1878 (*Agalena*) ♀ (Ageleninae) NMNH

Agelenopsis neavia (Walckenaer) 1805 (*Agelena*) ♂♀ (Ageleninae) NMNH

Coelotes terrestris (Wider) 1834 (*Aranea*) ♀ (Coelotinae) NMNH
Coras medicinalis (Hentz) 1821 (*Tegenaria*) ♂♀ (Coelotinae) NMNH

Amaurobiidae

Altellopsis helvola Simon 1905, ♀ (Altellopsinae) MNHN
Amaurobius fenestralis (Stroem) 1768, ♂♀ (Amaurobiinae) AMNH
Anisacate feugianus (Simon) 1884 (*Amaurobius*) ♀ (Macrobuninae) MNHN
A. feugianus bransfieldi Usher, 1983 (*Auximus*) ♀ (Macrobuninae) BMNH
Auximella harpagula (Simon) 1906 (*Auximus*) ♂♀ (Macrobuninae) MNHN
Badumna longinquus (L. Koch) 1872 (*Amaurobius*) ♂♀ (Desinae) AMNH
Barrisca nannella Chamberlin & Ivie 1936, ♂ (Rhoicininae) AMNH
Callioplus hoplites (Bishop & Crosby) 1926, (*Amaurobius*) ♂♀ (Amaurobiinae) AMNH
Callobius bennetti (Blackwall) 1848 (*Ciniflo*) ♂♀ (Amaurobiinae) AMNH
C. nevadensis (Simon) 1884 (*Amaurobius*) ♂♀ (Amaurobiinae) UCB
Chresiona convexa Simon 1903, ♀ (Macrobuninae) MNHN
C. nigrosignata Simon 1903, ♀ (Macrobuninae) MNHN
Desis formidabilis (O. P. Cambridge) 1890 (*Robsonia*) ♂♀ (Desinae) NMSA
Emmenomma beauchenicum Usher 1983, ♀ (Macrobuninae) BMNH
Exlinea sp., ♂♀ (Metaltellinae) AMNH
Macrobunus backhauseni (Simon) 1896 (*Myro*) ♂♀ (Macrobuninae) MNHN
M. caffer Simon (*Myro*) ♀ (Macrobuninae) MNHN
M. chilensis (Simon) 1888 (*Myro*) ♂ (Macrobuninae) MNHN
Matachia sp., ♀ (Matachiinae) UCB
Myro kerguelensis Cambridge 1876, ♂♀ (Desinae) NMSA
Neuqenia paupercula Simon (*Myropsis*) ♀ (Altellopsinae) MNHN
Obatala armata Lehtinen 1967 (Macrobuninae) ♀ MRAC, ♂ SAM
Pimus pitus Chamberlin 1947, ♂♀ (Macrobuninae) AMNH
Porteria albopunctata Simon 1904, ♂♀ (Desinae) MNHN
Pseudauximus invalidus Simon 1898 (*Cybaeus*) ♀ (Amaurobiidae: Macrobuninae) MNHN
P. pallidus Purcell 1903, ♂♀ (Macrobuninae) SAM
Retiro crinitus (Simon) 1892 (*Auximus*) ♀ (Macrobuninae) MNHN
R. fulvipes (Simon) 1906 (*Auximus*) ♀ (Macrobuninae) MNHN
R. granadensis (Keyserling) 1877 (*Amaurobius*) F (Macrobuninae) BMNH
R. procerulus (Simon) 1906 (*Auximus*) ♂♀ (Macrobuninae) MNHN
R. quitensis (Simon) 1906 (*Auximus*) ♀ (Macrobuninae) MNHN
R. rhombifer (Simon) 1906 (*Auximus*) ♀ (Macrobuninae) MNHN
Rhoicinus rothi Exline 1960, ♂ (Rhoicininae) AMNH
Rubrius antarcticus (Karsch) 1880 (*Cybeaus*) ♂♀ (Macrobuninae) BMNH
R. castaneifrons (Simon) 1884 (*Coeletes*) ♂♀ (Macrobuninae) MNHN
R. subfasciatus Simon 1884 (*Coelotes*) ♂♀ (Macrobuninae) MNHN
R. major (Simon) 1904 (*Pionaces*) ♂♀ (Macrobuninae) MNHN
Stiphidion facetum Simon 1902, ♂♀ (Stiphidiinae) AMNH
Tamagrina chhanguensis Tikader 1970, ♀ (Amaurobiinae), BMNH
Walmus latescens (Chamberlin) 1919 (*Auximus*) ♂♀ (Amaurobiinae) AMNH
Yacolla pikelini Lehtinen 1967, ♀ (Altellopsinae) MNHN

Ctenidae

Acanthoctenus sp., ♂♀ (Acanthocteninae) NMNH
Ctenus ceylonensis F. O. P. Cambridge 1897, ♂ (Cteninae) BMNH

Cybaeidae

Cybaeus tetricus (C. L. Koch) 1839 (*Amaurobius*) ♂♀, MNHN

Dictynidae

Archaeodictyna ulova Griswold & Meikle-Griswold 1987, ♂♀ (Dictyninae) NMSA
Argyroneta aquatica (Clerck) 1757 (*Araneus*) ♂♀ (Argyronetinae) AMNH
Dictyna peragrata Bishop & Ruderman 1946, ♂♀ (Dictyninae) UCB

Liocranidae

Agroeca pratensis Emerton 1889, ♂♀, AMNH, NMNH

Miturgidae

Amaurobioides africanus Hewitt 1917, ♂♀ (Amaurobioidinae) NMSA
Campostichomma pumilum Simon 1898, ♂ (Machadoniinae) MNHN
C. seriatum Simon 1898, ♂♀ (Machadoniinae) MNHN
Devendra pardale (Simon) 1898 (*Campostichomma*) ♂♀ (Machadoniinae) MNHN

Eutichurus ferox Simon 1896, ♂♀ (Eutichurinae) MNHN
E. putus O. P. Cambridge 1898, ♀ (Eutichurinae) BMNH
Machadonia robustum (Simon) 1898 (*Campostichomma*) ♂♀ (Machadoniinae) MNHN
Miturga severa Simon 1909, ♂♀ (Miturginae) MNHN
Phanotea latibricola Lawrence 1952, ♀ (Machadoniinae) NMSA
P. natalensis Lawrence 1951, ♂♀ (Machadoniinae) NMSA
P. peringueyi Simon 1896, ♂♀ (Machadoniinae) CAS
P. simoni Lawrence 1951, ♀ (Machadoniinae) NMSA
Raecius sp., ♀ (Uliodoninae) MRAC
Radulphius bicolor Keyserling 1891, ♀ (Eutichurinae) BMNH
Syrisca affinis (Banks) 1897 (*Teminius*) ♀ (Miturginae) NMNH
Taurongia divergens (Hogg) 1900 (*Hylobius*) ♀ (Uliodoninae) BMNH
Tengella radiata (Kulczynski) 1909 (*Metafecenia*) ♂♀ (Tengellinae) NMNH
Uduba funerea Simon 1906, ♀ (Uliodoninae) MNHN
Uliodon frenata (L. Koch) 1873 (*Zora*) ♀ (Uliodoninae) BMNH; (also ♂♀ types of *U. hawkesi* Hogg 1911, BMNH)
Zorocrates sp., ♂♀ (Tengellinae) UCB
Zorodictyna inhonesta (Simon) 1906 (*Uduba*) ♀ (Uliodoninae) MNHN

Pisauridae

Pisaura mirabilis (Clerck) 1757 (*Araneus*) ♂♀, NMNH

Titanoecidae

Goeldia sp., ♂♀, AMNH
Pandava sp., ♂♀, AMNH
Titanoeca silvicola Chamberlin & Ivie 1947, ♂♀, AMNH

APPENDIX 2
CHARACTER MATRIX FOR THE PHYXELIDINE CLADOGRAMS

AMAUROBIUS
fenestralis 0000000000 0009910000 9900999000 9900999900 0029000990
9990099901 0020099909 9999090000 9999000099 9901000090 0

VYTFUTIA
bedel 0101100100 0009909000 9900999100 0000999910 0000000990
9990099901 0000099909 9999090100 9999000099 9900909090 9

XEVIOSO
jocquei 0111191901 0010009000 9910000000 9900999999 9999100990
9990101010 0020110111 0100999999 9999999999 9999999999 9
tuberculata 0111191100 0010009000 9910010000 9921110199 9999100990
9990111110 0020110011 2101092100 9999000191 0100000090 0
orthomeles 0111191101 0010009000 9910010000 9900999999 9999100990
9990111110 0020110011 2101092100 9999000190 0100000090 0
amica 0111101101 0010009000 9910010000 9901100999 9999100990
9990111110 0020110011 2101092100 9999000190 0100000090 0
zuluana 0111191101 0010009100 9901099000 9911111199 9999100990
9990101110 0020110111 1001092100 9999000191 0100000090 0
lichmadina 0111101101 0010009000 9910001000 9921000099 9999100990
9990111010 0120110111 1101092100 9999000192 1110000090 1
kulufa 0111101101 0010009000 9910001000 9921000099 9999100990
9990111010 0120110111 1101092100 9999000192 1110000090 1
colobata 0111191901 0010009000 9910100000 9911101199 9999100990
9990111010 1020110111 0101999999 9999999999 9999999999 9
aululata 0111191100 0010009000 9900100000 9921101199 9999100990
9990111010 1020110111 1101092000 9999000099 9900000090 0

PONGOLANIA
pongola 0111101199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999092002 9999000099 9900000091 0
chrysionaria 0111101199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999092002 9999000099 9900000091 0

VIDOLE

sothoana 0111191100 0010009100 9911000000 9900999999 9999100990
9990111000 0020101111 9110101000 9999000099 9900000110 0

helicigyna 0111191100 0010009100 9911000000 9900999999 9999100990
9990111000 0010101010 0110101000 9999000199 9900000100 0

lyra 0111191199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999102002 9999000099 0900000110 0

capensis 0111101100 0010009100 9911000000 9900999999 9999100990
9990111000 0020101111 2110111000 9999000099 9900000110 0

schreineri 0111191100 0010009100 9911000000 9900999999 9999100990
9990111000 0020101111 2110111000 9999000099 9900000110 0

MATUNDUA

silvatica 0111190100 0010009000 9900999000 9900999999 9999100990
9990100901 0920110910 0001101002 9999000099 9900000090 0

NAMAQUARACHNE

thaumatula 0111190100 0110009001 1100099100 0020999999 9999111011
0000099900 0910099999 9999090110 9999100099 9900001090 0

khoikhoiana 0111190101 0110009001 1100099100 0020999999 9999111011
0000099900 0910099999 9999090110 9999100099 9900001090 0

tropata 0111100101 0110009001 0000099100 0000999911 0099011001
0000099900 0910099999 9999090110 9999100099 9900001090 0

hottentotta 0111190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999092110 9999000099 9900001090 0

angulata 0111190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999092110 9999000099 9900001090 0

LAMAIKA

distincta 0101100901 0010110000 9900999100 0010999910 1210011100
0000099900 0910099909 9999999999 9999999999 9999999999 9

MALAIKA

longipes 0101110110 0010111000 9900999000 9900999910 1210011100
0101099900 0910099909 9999090000 9999000219 0001100090 0

delicatula 0101110110 0010111000 9900999000 9900999910 1210011100
0101099900 0910099909 9999090000 9999000219 0001100090 0

KULALANIA

antiqua 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090100 9999000219 0000010090 0

AMBOHIMA

sublima 1101100100 0010011000 9900999000 9910999999 9999111110
0001099900 0900099909 9999090100 9999000109 0001010090 0

pauliani 1101100199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090100 9999000109 0001010090 0

THEMACRYS

silvicola 0101100100 0011009000 9900999110 0010999911 0091011100
1000099900 0910099909 9999090001 1000000099 9901000090 0

monticola 0101190100 0011009000 9900999110 0010999911 0091011100
1000099900 0910099909 9999090001 0000000099 9901000090 0

ukhahlamba 0101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 1000000099 9901000090 0

irrorata 0101190100 1011009000 9900999101 0010999911 0091011100
1000099900 0910099909 9999090001 0000000099 9901000090 0

cavernicola 0101190100 0011009000 9900999101 0010999911 0091011100
1000099900 0910099909 9999090001 0000000099 9901000090 0

PHYXELIDA

mirabilis 0101190100 1010009110 9901099100 0010999911 0100011100
0000099900 0921099909 9999090001 0000000099 9901000090 0

abyssinica 0101190900 1010009110 9900099100 0010999911 0100011100
0000099900 0911099909 9999999999 9999999999 9999999999 9
kipia 1101190900 1010009100 9901099100 0010999910 0100011100
0000099900 0921099909 9999999999 9999999999 9999999999 9
sindanoa 1101190100 0010009110 9900099000 9900999911 0010011100
0010099900 0920099909 9999090001 0000000099 9901000090 0
carcharata 1101190100 0010009110 9901099000 9900999911 0010011100
0010099900 0920099909 9999090001 1000000099 9901000090 0
tanganensis 1101190100 0010009110 9900099100 1100999911 0100011100
0000099900 0920099909 9999090001 0110001099 9901000090 0
bifoveata 1101190100 0010009110 9900099100 1100999911 0100011100
0000099901 0920099909 9999090001 0110001099 9901000090 0
makapanensis 1101100100 0010009110 9901099999 9999999911 0100011100
0000099900 0921099909 9999090001 0000000099 9901000090 0
pingoana 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0000000099 9901000090 0
anatolica 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0000000099 9901000090 0
umlima 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0001010099 9901000090 0
crassibursa 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0001010099 9901000090 0
eurygyna 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0001010099 9901000090 0
irwini 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0001010099 9901000090 0
nebulosa 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0001010099 9901000090 0
apwania 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0100001099 9901000090 0
jabalina 1101190199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0001001099 9901000090 0
fanivelona 1101100199 9999999999 9999999999 9999999999 9999999999
9999999999 9999999999 9999090001 0111001099 9901000090 0
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